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THE LANCET

No. 7060 LONDON SATURDAY 20 DECEMBER 1958 VOL. II FOR 1958

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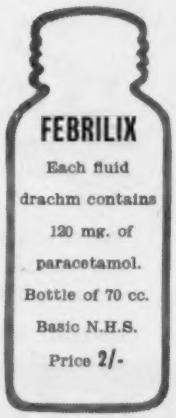

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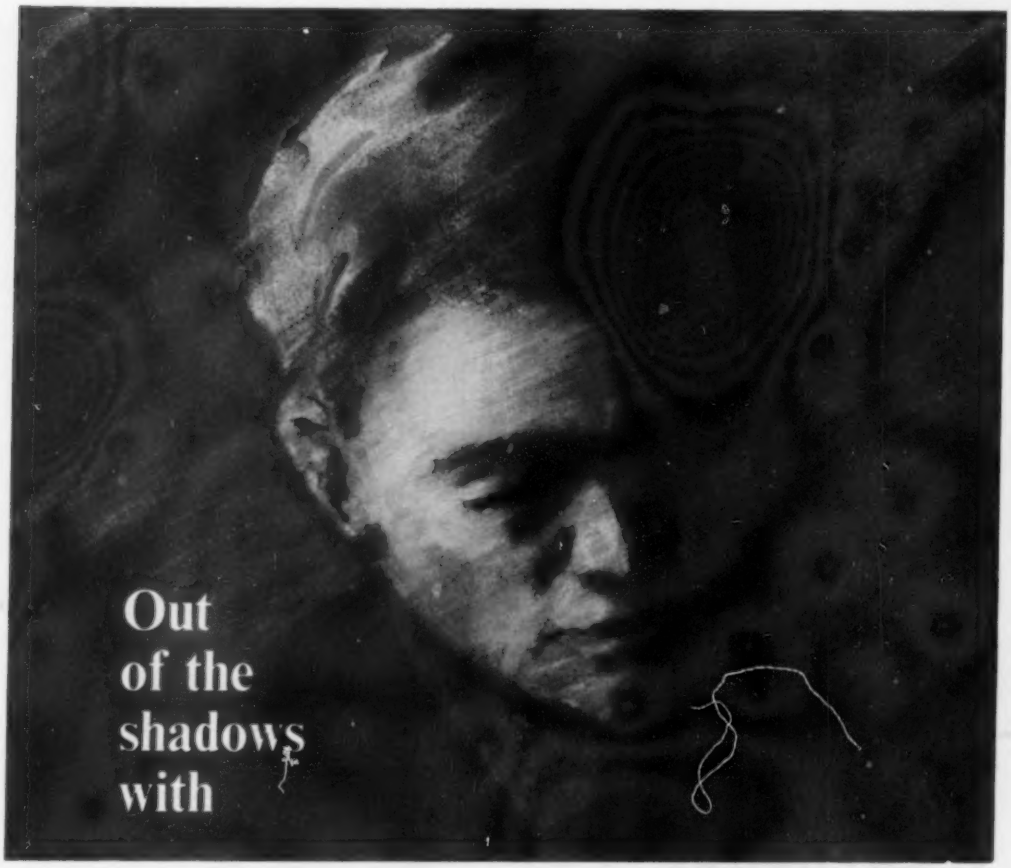

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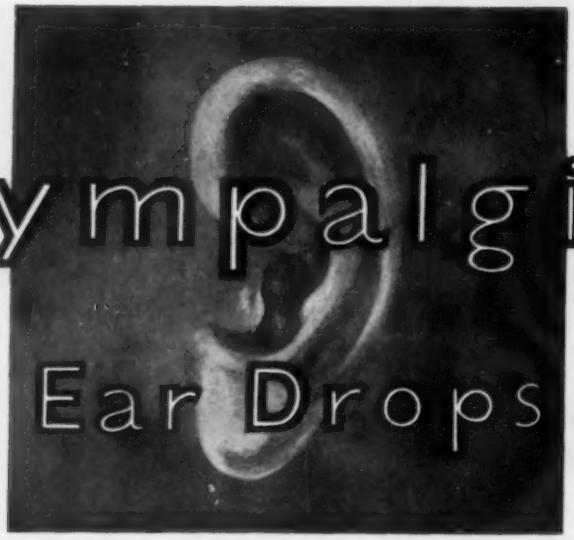

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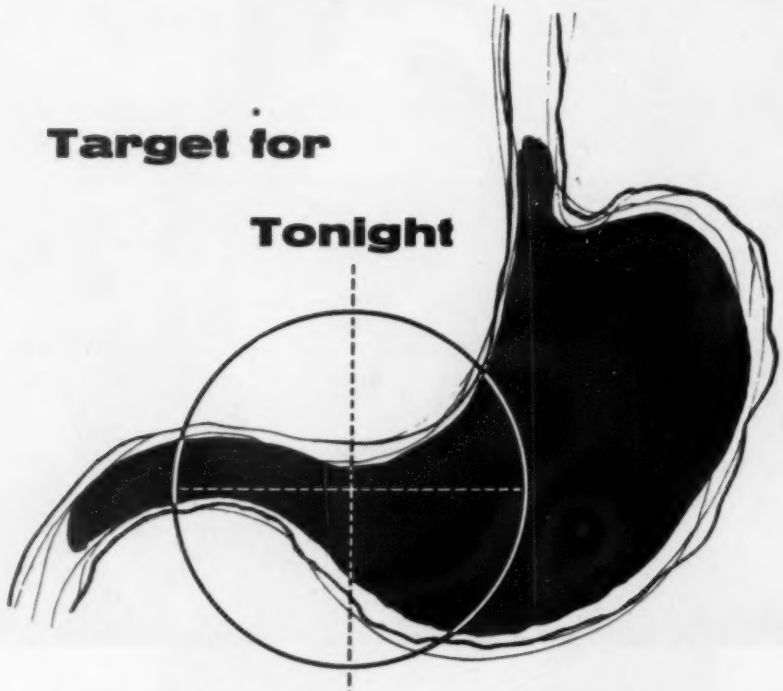

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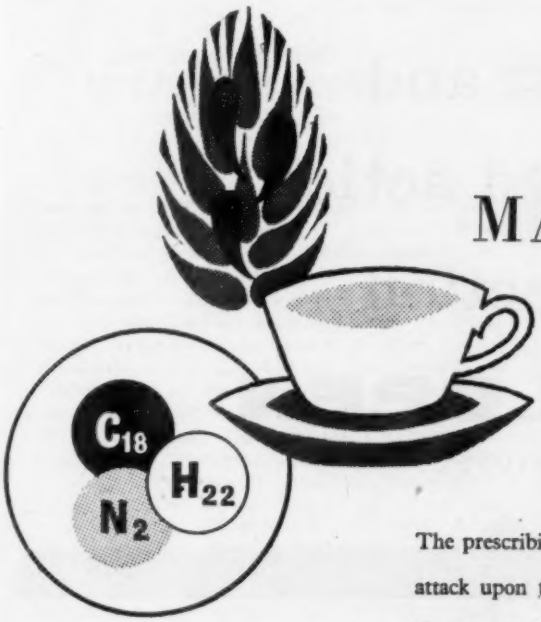

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THE MANAGEMENT OF CIVILIAN LIVER INJURIES

ERNEST W. GRAHAME
M.D., Ch.M. Glasg., F.R.C.S., F.R.C.S.E.
CONSULTANT SURGEON,
MIDDLESBROUGH GENERAL HOSPITAL, YORKSHIRE

ALTHOUGH the liver is the largest organ in the body and is relatively superficial over a wide area, it is seldom injured. On the other hand, Glenn (1956) estimated that a third of patients with liver injuries die at the time of the accident, that another third die within six hours, and that only the remaining third are likely to survive. Madding (1955) attributed the high fatality-rate to (1) errors in diagnosis, (2) associated lesions, and (3) injudicious treatment.

The following is an account of cases of liver injury which have been under my care during the past eleven years at Middlesbrough General Hospital, which for eight years has been the main accident centre on Tees-side. For works accidents this area is said to have a worse record than any other in the country: in 1956 it had 4758 such accidents, 39 of which were fatal. Road accidents, however, are relatively few.

Types of Injuries

Liver injuries may be open, as from stabbing or gunshot, but more commonly in this country they are part of closed abdominal wounds. They fall into several groups:

Neonatal injuries.—Although hepatic bleeding can be a cause of stillbirth (Mason Brown 1957), my 2 patients were both alive on admission.

As a rule these children are overweight at birth and collapse within the first few days of life. The hæmatoma is usually in the line of the lower costal margin and it ruptures much earlier than a subcapsular splenic hæmatoma would. The reason for this may be that the sharp lower edge of the ribs impinges on it. Perhaps another reason is the relatively large size of the infant's liver compared with the adult organ. In overweight babies it may be particularly vulnerable.

Stab wounds.—Some of these are self-inflicted—e.g., those resulting from such stupid practices as holding a knife with the point against the body and the handle against a solid object while binding the handle with string. They may be relatively trivial, even when the knife has entered the peritoneal cavity; but it is not always possible, even at operation, to estimate the depth of penetration.

Gunshot wounds.—Other organs are likely to be damaged as well, either superficially or by penetration or perforation. Bullets from rifle shots may traverse the liver and leave the body.

Concussion injuries.—Minor concussion of the liver causes superficial hæmatomas. Major concussion is nearly always associated with fractured ribs, except in young children, whose thoracic cage is very elastic. Intrathoracic and other abdominal complications are frequent.

The liver may be widely disrupted with many fragments torn off or devitalised; or a single large portion may be avulsed; or it may be split vertically but incompletely in the region of the falciform ligament. This last type results from violent blows on the upper abdomen or over the lower posterior thoracic region. In either case the force tends to spread the relatively fixed liver around the vertebral column and the great midline vessels. It also disrupts the left branch of the portal vein.

Symptoms and Signs

In the neonatal type the baby, though often overweight, is usually healthy at birth; but within the next four days it suddenly becomes pale, with panting respirations and all the signs of massive internal hæmorrhage. The sudden onset and appearance of the child are so characteristic that the diagnosis can be made with considerable confidence. Radiography shows the bowel floating upwards on the blood when the infant is held vertical (Mason Brown 1957).

In many of the other types there is no sure guide to diagnosis. The story of a blow over the upper right abdomen should always make the clinician think of injury to the liver; but a blow over the lower thoracic region posteriorly can also cause hepatic disruption. There is then persistent pain over the liver, which is worse on respiration and movement; and pain may also be referred to the right shoulder or to the lower dorsal spines. Shock is absent in some of the less severe cases, especially after stabbing, and the diagnosis can be missed until it is too late. Avulsion of a major portion of liver, on the other hand, causes severe shock long before there is any other sign of abdominal hæmorrhage.

With open wounds, surface bleeding may be slight; but this bears as little relation to the severity of the internal hæmorrhage as does the size of the surface wound to its depth. Internal bleeding may also be delayed.

When there is much bleeding, tenderness spreads from over the injured area to the right iliac fossa and then to the rest of the abdomen. Rebound tenderness, however, cannot always be elicited, and dullness in the right flank is found only in severe cases.

The temperature, pulse-rate, and blood-pressure may be perfectly normal at first; and, even later, bile extravasation, like head injury, can slow the pulse-rate.

X-ray examination may reveal a foreign body, fractured ribs, air or fluid in the chest, concussion injury or collapse of the lung, a raised diaphragm from the accumulation of blood underneath it, or the presence of gas if a hollow viscus has been ruptured. But if one suspects that the patient has a major liver injury, X-ray examination at this stage is a waste of valuable time. Ogilvie (1944) was of the same opinion.

Choice of Treatment

Blood should be taken at once for grouping and cross-matching. Thereafter, there are two opposing views on treatment. Madding (1946) reported that of 829 liver wounds in U.S. Servicemen—mostly battle casualties—only 9% bled at the time of exploration. Perhaps this atypical group was in Aird's mind when he recommended that the treatment of such wounds should be conservative, provided that injury to a hollow viscus can be ruled out (Aird 1957). From a second series Madding (1955) concluded that far less harm is done by an unnecessary exploration of doubtful cases than by waiting until the diagnosis is certain. Clarke (1954) is very emphatic that laparotomy may be the only safe method of diagnosis, as well as the best safeguard against late perforation of a damaged intestine.

In my opinion the treatment should depend on the type of injury.

Neonatal injuries.—It is surprising how much blood can be in an infant's abdomen even though the liver wound may not be bleeding at the time of the laparotomy. It seems logical that this blood should be removed and the liver wound repaired.

Small concussion injuries.—Unlike subcapsular hæmatomas of the spleen, small hæmatomas under the liver

capsule do not usually rupture. It is reasonable therefore not to operate unless the patient's condition deteriorates.

Small stab wounds may be watched provided that the point of entry leaves no doubt that no other organ or omentum has been injured. Such cases, however, are rare: even when the patient thinks that the instrument has penetrated only a short distance, it may have entered the liver, particularly when the wound is over the left lobe.

Gunshot wounds require exploration, not because the shot needs removing but because stomach or bowel are likely to have been injured.

Major concussion injuries.—Early operation is indicated. One cannot be sure, clinically, of the extent of the internal damage. There may be several pints of blood, and loose fragments of liver, in the abdomen; devitalised areas offer a nidus for organisms; other organs may have been damaged; and late bile peritonitis is a possibility.

Operative Treatment

Preparation

As soon as operation is decided on, plasma should be infused, pending the arrival of cross-matched blood. When the blood comes, it may be necessary to set up two drips—running rather than dripping. Most of the patients are relatively young; so rapid transfusion is not likely to embarrass the heart action in such an acute blood-loss. Severe liver injuries are among the most urgent surgical emergencies.

No time should be wasted on such preliminaries as changing the patient's clothes, or trying to raise his blood-pressure to an arbitrary level, before operation. Modern vasopressor drugs can be administered during rapid transfusion.

If I suspect a patient of severe liver injury, I take him to the theatre as he is. Trousers and boots can be removed in an anteroom: shirt, vests, and socks can be left on. The patient's abdomen can be gently prepared by an assistant before the anæsthetic is given and while the surgeon is scrubbing up. The surgeon can finish the skin preparation and towel up the operation site, still before the anæsthetist begins. This shortens the time during which the patient is under the anæsthetic; and it lessens the danger of massive intra-abdominal bleeding when the abdominal wall relaxes under the influence of powerful relaxants. Also release of intra-abdominal tension when the abdomen is opened may result in a sudden gush of blood which could easily lead to death on the table.

As soon as the patient is anæsthetised a large-bore stomach-tube is passed: the stomach is rarely empty.

Operation

Transverse and subcostal incisions have been recommended, but the safest is the midline approach. This can be extended to right or left as necessary. The liver and spleen are first examined. If there is a large rent in the liver, grasping the vessels in the free edge of the lesser omentum will help to control the bleeding or they may be temporarily clamped. Free blood and clots are then quickly removed by hand and by suction. If injury to gut or omentum is suspected, it is safest and quickest to lift all the bowel out from the abdomen: injured parts can be covered with gauze while the liver is attended to.

If the main branches of the portal vein or hepatic artery bleed on release of the free edge of the lesser omentum, they should be ligated. They can usually be withdrawn from the liver sufficiently to be secured, but some tissue may have to be cut away to make this easier.

Foreign bodies or loose fragments of liver should be removed. If the left lobe is almost torn off, it too should be removed, as in partial hepatectomy (Raven 1957). Most vertical splits, however, are far from complete and should be sutured. The catgut should pass into the liver as deep as the wound in order to obliterate dead space. Various plates have been recommended as an aid to this, but they seem to me valueless because the deeper areas of the liver are less likely to hold a tightly pulled suture than is the capsule. In any case, approximation only is required, not hæmostatic pressure.

Edge-to-edge suturing is impossible in fragmentation injuries, but Ogilvie (1944) recommended passing a few catgut stitches across the rent in the liver and tying them over a fold of omentum which has been pushed into the gap. Packing with gauze or with various artificial sponges is undesirable: gauze may promote pressure necrosis and sponges are useless as hæmostats.

When the liver has been dealt with, it is essential to search for other damage. If the diaphragm is torn the appropriate coronary ligaments can be divided between ligatures so that the liver can be eased out of the way (Aird 1957). Later the ligaments can be repaired by tying the ligatures together.

Postoperative Care

Blood-transfusion should be continued until the estimated blood-loss has been replaced, and careful watch should be kept on the lungs for signs of collapse or fluid. Besides breathing exercises, aspiration of the chest may be necessary.

Antibiotics should be used with discrimination. The liver harbours anaerobic bacteria, and these may multiply under the influence of local injury or ischæmia (Sparkman and Fogelman 1954).

Complications

While hæmorrhage into the peritoneal cavity is an urgent matter, the patient can die just as quickly from a massive collapse of the lung. The more organs are damaged the higher the death-rate; and extensive fragmentation injuries are especially liable to complications (Sparkman and Fogelman 1954).

Bile peritonitis is common in severe injuries, but fortunately it clears up. Bile fistulas also tend to close spontaneously: often the quickest way to cure them is to give the patient a liberal diet and get him walking about. Bile pleurisy is not common but requires repeated aspirations. Again, the patient should be made ambulant as soon as possible.

Infection may result in wound sepsis or a subphrenic or intrahepatic abscess.

Traumatic hæmobilia is relatively rare but it carries a high mortality: Barling (1956) described 14 cases with 6 deaths. It can come on several months after the injury and may appear to have nothing to do with it. Blood and bile accumulate in a cavity in the liver and eventually erupt into a bile channel and find their way into the bowel. The patient complains of upper abdominal or low posterior thoracic pain, griping in character, followed by hæmatemesis or often copiðus melæna. Jaundice is a feature of most cases. In the past many of these patients have been operated on for peptic ulcers, cholecystitis, or pancreatitis. The proper treatment is to explore the cavity in the liver, clear out the clot, and introduce a large drainage-tube. Spector's patient had several laparotomies and eventually had his right hepatic artery tied with apparent success (Spector 1957): this procedure is worth considering in refractory cases.

Personal Series

My series includes 62 cases. Its composition is shown in the table.

SERIES OF CASES OF LIVER INJURIES

Type of injury	Numbers	Deaths
Neonatal	2	1
Small concussion	35	0
Stab wound:		
Assault	3	0
Accidental	4	0
Gunshot wound	1	0
Major concussion:		
Avulsion	1	0
Disruption	4	0
Fragmentation	12	0
Total	62	1

Neonatal Injuries

My first case—the seventh infant reported to have survived—was described by Greaves (1955); it was unusual in that it weighed only 5 lb. 13 oz. A second infant was seen by Greaves some months later and the history was similar.

The second baby weighed 10 lb. 5 oz. at birth; and collapsed the day after. I opened the abdomen under 0·5% lignocaine infiltration: it was full of blood. A tear in the right lobe of the liver, about two inches long, was sutured. After removing most of the free blood, I drained the abdomen. The infant received about 300 ml. blood; but it died early next day. Post-mortem examination showed no lesion apart from the repaired tear in the liver. There were no hæmangiomata and the abdomen was dry.

Small Concussion Injuries

Of 35 patients in this group 8 were explored. None were bleeding on laparotomy and the capsule was intact in every case. They were all closed without drainage.

Stab Wounds

I operated on 5 of the 7 patients. 4 had their operation immediately after admission: none were bleeding and the abdomens could be closed without drainage. The 5th patient had an accidental self-inflicted wound.

He was kept under observation, and fifteen hours later he collapsed. He was transfused and laparotomy was undertaken at once. His abdomen was full of blood. The wound had traversed the left lobe of the liver and had punctured a small vein in the lesser omentum. This was tied after the abdomen had been cleared of blood. The liver was not bleeding and was not sutured. The abdominal wound was closed without drainage.

All 7 patients recovered.

Gunshot Wound

My only patient in this group had a laparotomy and many small punctures in his bowel repaired. There was no bleeding from the liver and very little blood in the peritoneal cavity. He made a complete recovery.

Major Concussion Injuries

Only 1 patient had complete avulsion of a portion of liver: he had been struck forcibly from behind against the ground.

On admission he showed severe shock, and the diagnosis of intra-abdominal injury was made. Quickly cross-matched blood, two pints, was given and his abdomen was explored. It was full of blood with a fairly large portion of the left lobe of the liver lying free. This was removed, the vessels in the free border of the lesser omentum were gripped, and a main branch of the portal vein was secured. Apart from a contused area on the anterior surface of the stomach, there was no other injury. The abdomen was cleared of blood and closed with drainage. He made an uninterrupted recovery.

Of 4 patients admitted with disruption of the liver 2 had been crushed between vehicles and a wall, 1 had been struck violently from behind, and 1 from in front. All had fractured ribs. Treatment was the same in each case—quick transfusion, early operation, removal of blood from the abdomen, securing main branches of the portal vein, suture of the liver, and multiple drains. All were in the operating-theatre within an hour of admission, and none had their blood-pressures recorded before operation. They received an average of seven pints of blood—usually two before, three during, and the rest after operation. All had postoperative intravenous glucose. None developed chest complications but all drained bile from their wounds for two or three weeks.

The 12 patients with major concussion and fragmentation injuries included 2 children. Neither of these had fractured ribs, although all the adults had. In most cases small pieces of liver were loose and had to be removed. There could be no question of suturing: not only was it difficult to reach the right surface of the liver but the injured areas would not have held sutures unless these were placed very far apart. All recovered, though 1 also had a concussion injury of the lung, which was treated with concentrated plasma before operation, and 10 developed collapse of the right lower lobes.

1 patient had traumatic hæmobilia a month after admission, while he was still in hospital. Fortunately, he had only one attack of hæmatemesis and melæna. On exploration I removed the contents of the traumatic cyst of his liver and drained the cavity and the abdomen. He made a satisfactory recovery.

Summary

A series of 62 cases of suspected liver injury is reviewed. Only 1 patient died, an infant aged 2 days.

In severe cases early diagnosis and early laparotomy are essential. Time should not be wasted on routine radiography or on attempting to raise the blood-pressure to some arbitrary figure.

Where the injury is serious, drainage of the peritoneal cavity should be part of the operative routine.

In less severe cases a conservative policy has generally been successful.

Common complications include multiple injuries, infection, pulmonary collapse, bile peritonitis, and bile fistula. A case of traumatic hæmobilia was operated on successfully.

At any hospital dealing with accident surgery, it is important to have a competent general surgical organisation, and the surgeons should work chiefly at that hospital. They should be experienced in traumatic surgery and speedy in their work. Only thus are many cases of serious liver injuries likely to survive.

I wish to acknowledge the help given by Mr. R. F. Hendtlass, who operated on some of the cases; by the many anæsthetists; by Dr. S. Wray and his staff of the Central Clinical Laboratory, Middlesbrough General Hospital; and by Dr. J. L. Greaves, consultant pædiatrician.

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ABSORPTION OF ORALLY ADMINISTERED VITAMIN B_{12} IN PERNICIOUS ANÆMIA

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THE mechanisms of absorption of vitamin B_{12} from the gastrointestinal tract have been the subject of much research (*Lancet* 1957, 1958). It has been generally accepted that efficiency of absorption depends upon adequate gastric secretion of intrinsic factor (Castle 1929, 1953), and that in pernicious anæmia deficient absorption of vitamin B_{12} is the result of defective gastric secretory function.

In pernicious anæmia the simultaneous administration of intrinsic factor (from human or other animal source) can increase the efficiency of absorption of small oral doses of vitamin B_{12} (see Ungley 1950, Glass and Boyd 1953, Latner 1958a). In long-term clinical trials, however, oral preparations containing small amounts of vitamin B_{12}, together with intrinsic factor of animal origin, have been found unsuitable for maintenance therapy (Adams 1957, Blackburn et al. 1955, Lowenstein et al. 1957). The maintenance dose of the preparations used in these trials afforded the patients a total daily intake of only 6–7 μg. of vitamin B_{12}, which was occasionally increased to 15 μg.

Some patients apparently became refractory to intrinsic factor of heterologous origin (Killander 1957, 1958, Lowenstein et al. 1957, Schwartz et al. 1957). Antibodies to intrinsic factor have been recorded by Taylor and Morton (1958). Schwartz (1958) found "intrinsic-factor-inhibiting activity" in the serum of many, but not all, patients treated with oral vitamin B_{12} and hog intrinsic factor.

Heathcote and Mooney (1958) have gone so far as to suggest that intrinsic factor as normally considered does not exist, and have postulated that a preparation they claim to be a vitamin-B_{12}-peptide complex is better absorbed than vitamin B_{12} itself.

This has been criticised (Castle 1958, Green and Latner 1958, Latner 1958b, Herbert et al. 1958) on the grounds that the hæmatological responses produced by the vitamin-B_{12}-peptide complex might have occurred with pure vitamin B_{12} alone in similar dosage. Chow et al. (1958) claim that *d*-sorbitol increases the absorption of orally administered vitamin B_{12} in normal subjects, but there is as yet no evidence that this happens in patients with pernicious anæmia (Herbert 1958).

Isotope studies, while producing many conflicting observations, have shown that vitamin B_{12} is absorbed by more than one mechanism (*Lancet* 1958).

Glass et al. (1954), using radioactive vitamin B_{12}, found that in normal subjects there is a regression in the efficiency of absorption relative to increases of the oral dose between 0·5 and 50 μg. They calculate that after a single oral dose of 50 μg. only 1·5 μg. can be absorbed by a normal subject. But this limitation of absorption can be surmounted by giving vitamin B_{12} alone in high dosage. Ungley (1950) was the first to report that a single oral dose of 3000 μg. of vitamin B_{12} without intrinsic factor would cause prompt hæmatological improvement in cases of pernicious anæmia in relapse. After such large single doses as 500 μg. or more, early and significant rises in serum-vitamin-B_{12} levels were observed both in normal subjects and in pernicious-anæmia patients (Ross et al. 1954, Unglaub et al. 1954, Pitney and Beard 1954).

In short-term 15-day trials with a daily dose of 50 μg. of vitamin B_{12} alone, Chalmers and Hall (1954) reported hæmatological responses in six consecutive cases of pernicious anæmia in relapse. Similarly, Estren and Wasserman (1956) treated eight such patients with daily oral doses as low as 5–16·8 μg., and only one failed to respond. Some long-term studies with oral vitamin B_{12} alone have been made. Unglaub and Goldsmith (1955) recorded satisfactory clinical and hæmatological maintenance in eleven patients with pernicious anæmia who were given 3000 μg. of vitamin B_{12} alone at intervals of 4 weeks over a period of 4–18 months. When Conley and Krevans (1955) and Reisner et al. (1955) gave oral doses of 1000 μg. at intervals of 1–4 weeks there was no evidence of clinical or hæmatological relapse in their groups of fourteen and forty-three cases respectively.

In this paper we describe an attempt to assess clinically, hæmatologically, and by serum-vitamin-B_{12} estimations the effects of giving daily oral doses of 20–500 μg. of vitamin B_{12} for periods varying from 15 days to 50 months. This is an extension of work previously reported (Chalmers and Hall 1954).

Materials and Methods

Twenty-two cases of pernicious anæmia in relapse were studied.

All satisfied the clinical and hæmatological criteria for this diagnosis—namely, macrocytic anæmia, megaloblastic bone-marrow, histamine-fast achlorhydria—and they had a serum-vitamin-B_{12} value below 60 μμg. per ml. Two patients, however, did not have the last test performed. In the short-term series, one patient had significant involvement of the nervous system. All the patients were treated with oral vitamin B_{12} alone from the stage of relapse. Twenty-one were given a short-term 15-day trial and eleven of them, plus one additional patient—case 11 of Chalmers and Hall (1954)—were followed-up for a further 6–50 months.

The amount of oral vitamin B_{12} given ranged from 20 to 500 μg. daily. It was taken in a single dose, usually first thing in the morning, but some patients took it either at midday or at night. Each patient took the same dose throughout the trial except two; in case 4 it was increased from 50 to 100 μg. at the end of the short-term study, and in case 9 the dose was reduced from 100 to 50 μg. after the first 15 days. Initially pure vitamin B_{12} in 15 ml. of water was prescribed, but for the long-term studies this was changed to a syrup containing the vitamin B_{12} in a 2-drachm dose taken from a standard measure. The syrup base contained 20% w/v sucrose, and a small amount of sodium carboxymethylcellulose, with colouring and flavouring substances. It did not contain *d*-sorbitol (Chow et al. 1958).

The hæmatological techniques and the "range of normal values" were those described by Dacie (1956). Hæmoglobin was estimated by an oxyhæmoglobin method with a photoelectric colorimeter calibrated so that "100% Hb" = 14·8 g. of Hb per 100 ml. The serum-vitamin-B_{12} level was assayed by the *Euglena gracilis* technique (Ross 1952, Hutner et al. 1956). Each specimen of serum was tested at least twice at dilutions of 1/20 and 1/40, and whenever possible two specimens from the same patient were assayed simultaneously.

Serum from 120 normal people, aged 15–60, was tested, using identical methods of collection, storage, and assay, and gave a mean vitamin-B_{12} level of 390 μμg. per ml. (S.D. 119, S.E. of mean ± 10·9), and a range of 130–750 μμg. per ml. (Shinton 1958).

Through the courtesy of Dr. John Mills, we were also able to test the serum-vitamin-B_{12} values in twenty patients with pernicious anæmia, who, after initial parenteral therapy, had maintained normal hæmoglobin and red blood-cell values for 2 years while taking 100 μg. of oral vitamin B_{12} daily. These were compared with serum-vitamin-B_{12} values in fifteen patients, also with normal blood-counts, who were receiving 100 μg. of intramuscular vitamin B_{12} every month.

TABLE I—PERNICIOUS ANÆMIA IN RELAPSE TREATED FOR 15 DAYS WITH DAILY ORAL DOSES OF VITAMIN B_{12}

Case no.	Sex	Age (yr.)	Daily oral dose of vitamin B_{12} (μg.)	Hæmoglobin (g. per 100 ml.)		Red blood-cells (million per c.mm.)		Packed-cell volume (%)		Serum-vitamin-B_{12} (μμg. per ml.)		Maximum reticulocyte response (%)
				0	15 days	0	15 days	0	15 days	0	15 days	
1	F	54	20	4·4	8·4	0·94	2·19	12	25	—	—	23
2	F	78	25	7·4	9·1	1·7	2·16	23	28	35	75	6·8
3	M	61	50	11·8	14·2	2·9	4·27	37	41	35	—	—
4	M	72	50	6·2	8·6	1·5	2·2	21	29	25	—	6·9
5	M	60	100	5·3	5·7	1·27	1·6	16	17	50	75	6·5
6	M	67	100	11·1	11·1	3·11	3·31	34	34	15	85	—
7	F	43	100	5·9	9·0	1·64	2·71	20	31	35	—	21
8	M	63	100	6·7	5·5	1·7	1·35	19	15·5	20	60	10
9	M	64	100	8·6	11·0	2·2	3·15	24	33	50	—	—
10	M	46	200	12·3	14·5	2·84	3·87	37	45	20	—	10·5
11	F	46	200	6·7	9·8	1·46	2·92	20	32	25	90	25
12	M	62	200	4·3	7·8	1·00	2·20	12	24	30	180	34
13	M	45	200	8·1	12·3	1·88	3·07	24	39	30	90	11
14	F	65	500	4·9	9·2	1·25	3·05	16	32	25	260	23
15	M	57	500	4·5	8·0	1·01	2·51	14	29	20	280	44
16	M	72	500	6·1	8·6	1·36	2·06	18	27	35	280	33
17	M	60	500	6·3	10·5	1·48	2·94	19	34	30	490	23
18	M	43	500	3·9	6·2	1·30	2·80	16	26	30	260	26
19	M	67	500	11·5	13·2	2·70	3·39	36	39	20	280	15
20	M	53	500	3·4	8·0	1·06	2·10	11	25	50	250	33
21	F	56	500	5·9	8·5	1·50	2·70	17	29	30	210	32

Results

Short-term 15-day Trials

Table I summarises our results from the twenty-one cases of pernicious anæmia treated with oral vitamin B_{12} alone for 15 days. Of the thirteen who had daily oral doses of between 20 and 200 μg., all but three (cases 5, 6, and 8) showed a variable, but sometimes remarkable, hæmatological improvement. In one of those not responding by the 15th day (case 5) there was a delayed response (fig. 1). In this patient, who had a daily oral dose of 100 μg. of vitamin B_{12}, no reticulocyte peak was seen until the 21st day and the serum-vitamin-B_{12} level was not normal until tested on the 35th day. Unfortunately, in the two other patients (cases 6 and 8) who did not respond within 15 days, it was not possible to continue oral therapy. Nevertheless, of seven patients (cases 2, 5, 6, 8, 11–13) whose serum-vitamin-B_{12} level was tested on the 15th day, only one (case 12), who was having 200 μg. daily, showed a value within the normal range.

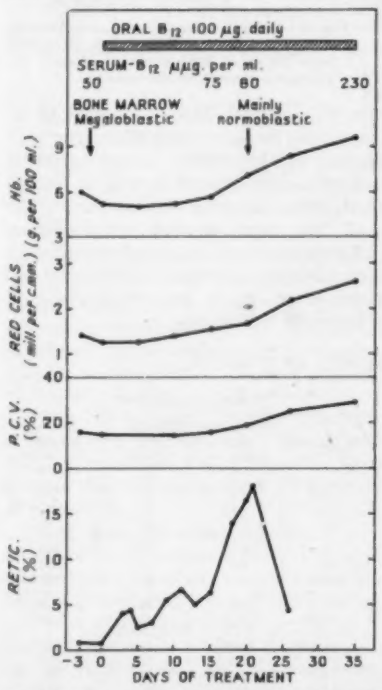

Fig. 1.—Delayed response to a daily oral dose of 100 μg. of vitamin B_{12} (case 5).

All the eight patients (cases 14–21) treated daily with an oral dose of 500 μg. of vitamin B_{12} showed uniformly successful and prompt hæmatological responses, and a striking increase in the serum-vitamin-B_{12} level (fig. 2) which was well within the normal range by the 10th day, and higher on the 15th day. Fig. 3 shows the maximum serum-vitamin-B_{12} levels reached by the 15th day in three patients (cases 5, 6, and 8) receiving 100 μg. of oral vitamin B_{12} daily, in three patients (cases 11–13) receiving 200 μg. daily, and (the shaded area) the range in eight patients (cases 14–21) receiving 500 μg. daily.

Long-term Studies

Twelve cases had uniform doses of oral vitamin B_{12} from the stage of relapse (table II).

Long-term therapy of 50 μg. was given daily to three patients (cases A, 3, and 9) for periods of 50, 21, or 22 months. All had normal hæmatological values within 2 months, but none maintained a satisfactory serum-vitamin-B_{12} level throughout the trial. Though they all kept in excellent health during the period of supervision, one (case A) showed a slight fall in hæmoglobin and red blood-cell values by the 45th month of treatment.

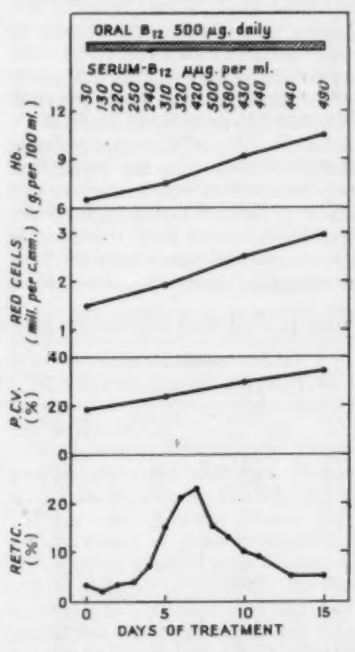

Fig. 2.—Initial 15-day response to a daily oral dose of 500 μg. of vitamin B_{12} (case 18).

Three patients (cases 4, 5, and 7) having 100 μg., two (cases 10 and 12) having 200 μg., and four (cases

14–16, and 18) having 500 μg. of oral vitamin B_{12} daily for periods of from 6 to 26 months reached and maintained serum-vitamin-B_{12} levels within the range of normal (table II and fig. 4). Three of these patients (cases 12, 16, and 18) had haemoglobin values below the lower limit of our "normal range" (13·5 g. per 100 ml.), but in two of them (cases 16 and 18) this value did not rise after changing to intramuscular therapy. We know that case 12 had defaulted in taking regular oral treatment.

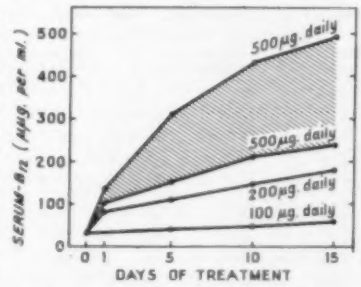

Fig. 3.—Serum-vitamin-B_{12} values in relation to the size of the daily oral dose of vitamin B_{12} during the first 15 days of treatment.

Eight patients (cases 3, 4, 7, 10, 14–16, and 18) were followed-up after changing from oral to intramuscular vitamin-B_{12}-maintenance therapy (table III and fig. 4). In only one (case 3), who was previously taking 50 μg. of oral vitamin B_{12} daily, was there any material difference in serum-vitamin-B_{12} values. One patient (case 4) had a slightly lower hæmoglobin when taking 100 μg. of oral vitamin B_{12} but the serum-vitamin-B_{12} value was normal. No neurological or other complications developed in any case during this trial.

The results of the serum-vitamin-B_{12} estimations on Dr. Mills' patients are shown in table IV. There was no striking difference between the serum-vitamin-B_{12} levels of the group maintained by oral vitamin B_{12} and the group who had intramuscular vitamin-B_{12} therapy, either in the range of individual values or in relation to the mean.

Discussion

Any attempt to assess the practical significance of publications reporting enhanced absorption of oral vitamin B_{12} when administered with animal sources of intrinsic factor, or with additives such as *d*-sorbitol, or in a complex such as vitamin-B_{12}-peptide, is confused by the fact that they refer to different materials given in different dosage schedules. Moreover, the results are derived from different methods of observation as well as from different methods of serum-vitamin-B_{12} assay and radioactive isotope techniques. Above all, it is impossible to relate many of these observations with what might have resulted from administration of vitamin B_{12} alone. Most reports about the absorption of orally administered vitamin B_{12} are concerned with the function of intrinsic factor, which has not yet been isolated in a pure state. Our results relate to the absorption and effects of pure vitamin B_{12} without the addition of any substance known to promote its intestinal absorption. Normal people and pernicious-anæmia patients may vary considerably in their capacity to absorb vitamin B_{12} from the intestinal tract (Ross et al. 1954, Unglaub et al. 1954, Doscherholmen and Hagen 1957).

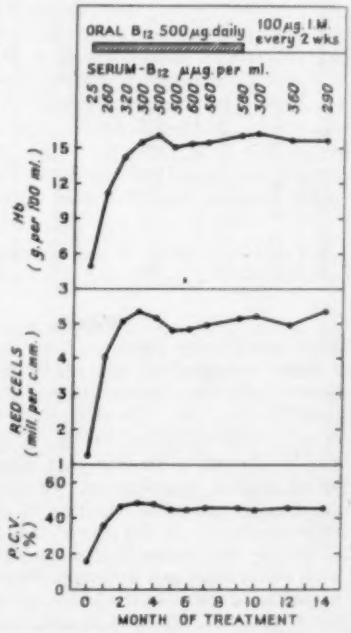

Fig. 4.—Initial remission and maintenance with 500 μg. of oral vitamin B_{12} daily; later 100 μg. of intramuscular vitamin B_{12} was given every 2 weeks (case 14).

Although Ungley (1950) in his early review suggested that smaller oral doses were often unpredictable in their effect on pernicious anæmia, others have shown that daily doses of 50 μg. or even less can produce significant clinical and hæmatological improvement in a not inconsiderable proportion of patients. Estren and Wasserman (1956) thought that partial rather than complete changes in gastric secretion (Goldhamer 1936, Campbell et al. 1949) might be responsible for the varying effect after such low doses of vitamin B_{12} by itself. In our series of twenty-one cases of pernicious anæmia in relapse, treated with oral vitamin B_{12} alone in doses varying from 20 to 500 μg. daily, all but three showed hæmatological improvement in 15 days (table I). As already mentioned, one of them showed a delayed response to continuous oral therapy, but in the other two it was not possible to continue the trial beyond the 15th day.

TABLE II—LONG-TERM MAINTENANCE THERAPY WITH DAILY ORAL DOSES OF VITAMIN B_{12}

Case no.	Sex	Age (yr.)	Values at beginning of trial				Daily oral dose of vitamin B_{12} (μg.)	Duration of treatment (mos.)	Values at end of trial			
			Hb (g. per 100 ml.)	Red blood-cells (million per c.mm.)	Packed-cell volume (%)	Serum-vitamin-B_{12} (μμg. per ml.)			Hb (g. per 100 ml.)	Red blood-cells (million per c.mm.)	Packed-cell volume (%)	Serum-vitamin-B_{12} (μμg. per ml.)
*A	F	58	10·4	2·6	33	—	50	50	12·2	4·67	42	70
3	M	61	11·8	2·9	34	35	50	21	13·8	4·98	44	110
9	M	64	8·6	2·2	24	50	50	22	15·0	5·33	43	140
4	M	72	6·2	1·5	21	25	100	14	13·8	4·7	45	550
5	M	60	5·3	1·27	16	50	100	26	14·3	4·7	44	260
7	F	43	5·9	1·64	20	35	100	17	14·3	4·7	45	330
10	M	46	12·3	2·84	37	20	200	17	15·4	5·2	49	280
12	M	82	4·3	1·00	12	30	200	6	13·0	4·5	42	220
14	F	65	4·9	1·25	16	25	500	9	15·4	5·2	46	610
15	M	57	4·5	1·01	14	20	500	6	15·3	5·3	51	460
16	M	72	6·1	1·36	18	35	500	12	13·3	4·6	44	250
18	M	43	3·9	1·30	16	30	500	9	13·2	4·5	42	250

* Case A = case 11 of Chalmers and Hall (1954).

TABLE III—EFFECT OF CHANGING MAINTENANCE THERAPY FROM THE ORAL TO THE INTRAMUSCULAR ROUTE

Case no.	Sex	Age (yr.)	Daily oral dose of vitamin B_{12} (μg.)	Duration of treatment (mos.)	Values at end of trial of oral maintenance therapy: Hb (g. per 100 ml.)	Red blood-cells (million per c.mm.)	Packed-cell volume (%)	Serum-vitamin-B_{12} ($\mu\mu$g. per ml.)	Fortnightly intramuscular dose of vitamin B_{12} (μg.)	Duration of treatment (mos.)	Values after intramuscular maintenance therapy: Hb (g. per 100 ml.)	Red blood-cells (million per c.mm.)	Packed-cell volume (%)	Serum-vitamin-B_{12} ($\mu\mu$g. per ml.)
3	M	61	50	21	13·8	4·98	44	110	250	7	14·3	5·24	47	450
4	M	72	100	14	13·8	4·7	45	550	100	·24	15·6	4·9	48	450
7	F	43	100	17	14·3	4·7	45	330	100	12	14·0	5·2	44	550
10	M	46	200	17	15·4	5·2	49	280	100	9	15·5	4·9	47	250
14	F	65	500	9	15·4	5·2	46	610	100	12	15·5	5·4	45	290
15	M	57	500	6	15·3	5·3	51	460	100	9	14·9	5·12	48	300
16	M	72	500	12	13·3	4·6	44	250	250	3	13·2	4·77	42	360
18	M	43	500	9	13·2	4·5	42	250	250	2	13·2	4·8	41	160

Hæmatological and clinical remission can occur before the serum-vitamin-B_{12} level reaches the normal range, and this was only attained within 15 days in patients taking a daily dose of 500 μg. These observations add further weight to the view that the use of extraneous sources of intrinsic factor, or of additives thought to enhance absorption of the vitamin in a complex form, is not essential for absorption of orally administered vitamin B_{12} by patients with pernicious anæmia. Vitamin B_{12} given alone is absorbed, and in adequate amounts is effective. Even very small daily oral doses are capable of producing a hæmatological effect, although the response may be slow.

Glass et al. (1954), as a result of radioactive vitamin-B_{12}-absorption studies, postulated an intramural intestinal

TABLE IV—SERUM-VITAMIN-B_{12} VALUES IN PERNICIOUS ANÆMIA DURING COMPLETE CLINICAL AND HÆMATOLOGICAL REMISSION

Maintenance therapy	Dose of vitamin B_{12}	Serum-vitamin-B_{12} level ($\mu\mu$g. per ml.)	
		Range	Mean
Oral (20 cases)	100 μg. daily for 2 years	160–380	280
*Intramuscular (15 cases)	100 μg. every 4 weeks for 2 years	110–380	230

* Serum was collected from patients immediately before the next injection was due.

" vitamin-B_{12} acceptor " which, with increasing saturation, would limit intestinal absorption of vitamin B_{12}. In his review, Glass (1956) states that this block of intestinal absorption becomes complete in pernicious anæmia, both in relapse and in remission. But, within the dosage range which we employed (20–500 μg. daily), there was evidence of more rapid absorption with progressive increase in dosage, so that absorption is possibly achieved by a " mass action " leading to diffusion through the intestinal wall. It is therefore apparent that there is more than one mechanism for the intestinal absorption of vitamin B_{12}.

Proof that the serum-vitamin-B_{12} level reflects the degree of tissue saturation is still lacking, but maintenance of a normal value is an essential aim of long-term therapy. Our long-term trials (table II), and the serum-vitamin-B_{12} levels found in the patients under Dr. Mills' care (table IV), indicate that serum-vitamin-B_{12} and hæmatological values can be held in patients who cooperate by taking oral vitamin B_{12} daily. However, we think that the dose should be at least 100 μg. daily, and that this could be increased with advantage. The importance of daily, rather than weekly or monthly, dosage is shown by Conley and Krevans (1955) and Reisner et al. (1955). These authors found that with doses of 1000 μg. given at intervals of 1–4 weeks, several patients after varying periods showed a decline in serum-vitamin-B_{12} level although their hæmoglobin and red blood-cell values remained within normal limits.

In an earlier report (Chalmers and Hall 1954) the opinion was expressed that, despite good clinical responses, oral therapy was not to be recommended for routine management of pernicious anæmia. We are still of the opinion that regular intramuscular injection of vitamin B_{12} is the most reliable method of ensuring a rapid response. Regular attendance for injections and clinical supervision afford ideal control and this is the best way of avoiding relapse. Even though patients may begin oral therapy with the best of intentions, it is likely that some will not fully carry out their instructions. But in special circumstances, such oral therapy as we have described may be indicated, provided the patient cooperates. In earlier cases we instructed patients to take the dose each morning, but this, though convenient and less likely to be overlooked, is not essential (see also Estren and Wasserman 1956).

We hope that these observations may go towards meeting the need for control studies with oral vitamin B_{12} alone (Castle 1958, Green and Latner 1958, Herbert et al. 1958) upon which basis the experience gained with various additives might be evaluated.

Summary

Further evidence is presented that oral vitamin B_{12} alone can be absorbed and utilised by patients suffering from pernicious anæmia.

The larger the daily oral dose the more prompt is the response and the return of the serum-vitamin-B_{12} level to the normal range.

Long-term studies, including serum-vitamin-B_{12} estimations, show that daily oral doses of 100 μg. or more of vitamin B_{12} can be effective in maintenance therapy.

There can be hæmatological and clinical remission without return of serum-vitamin-B_{12} level to normal.

Parenteral therapy with vitamin B_{12} is still the most reliable method of ensuring freedom from relapse in pernicious anæmia, but with the close cooperation of the patient oral treatment taken daily may be effective.

Our thanks are due to the physicians who referred cases for these prolonged clinical trials; to the patients for their cooperation;

to Dr. John Mills of Reading for sending specimens; to Dr. D. L. Mollin for serum-vitamin-B_{12} assays in earlier cases; to our technical staff, and particularly Miss A. Noirit, for their valuable assistance; and to Glaxo Laboratories Ltd. for supplying the vitamin B_{12}.

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VITAMIN B_{12} IN PERNICIOUS ANÆMIA
INTRAMUSCULAR OR ORAL?

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SINCE 1934 maintenance treatment and supervision of pernicious-anæmia patients at the Royal Berkshire Hospital has been carried out in a special clinic held at four-week intervals. Treatment is given at each attendance and red-cell and hæmoglobin estimations are made at alternate attendances. Patients have been on controlled maintenance treatment for as long as twenty-five years.

When liver extracts were given by injection we had much trouble from relapses, even though all the extracts had previously been proved active by clinical tests. One crude extract maintained satisfactory hæmoglobin and erythrocyte levels in all patients treated with a monthly dose containing active principle extracted from 10 g. of liver; but, though this seemed to be the most effective remedy then available, its efficacy eventually diminished. The manufacturers of liver extracts seemed unable to make a product of constant potency, and this made it essential that treatment should be controlled by hæmoglobin and erythrocyte estimations every two or three months.

TABLE I—EFFECT OF CHANGING MAINTENANCE DOSE OF VITAMIN B_{12}

Year	Dose (μg. per month)	Red blood-cells		
		Raised	Lowered	No change
1950	20	..	..	..
1951 } 1952 }	200	8	1	23
1953 } 1954 }	100	0	1	31

TABLE II—EFFECT OF GREATLY INCREASING MAINTENANCE DOSE

Erythrocytes (million per c.mm.)	Patients receiving 100 μg. per month	Patients receiving 1000 μg. per month
4·0	7 (8%)	7 (9%)
4·5	21 (26%)	26 (31%)
5·0	29 (36%)	32 (39%)
+5·0	24 (30%)	17 (21%)
Total	81	82

B_{12} by Injection

By January, 1951, we had treated three groups of patients for at least one year by monthly intramuscular injection of vitamin B_{12} in doses of either 20, 40, or 80 μg. (Mills and Hemsted 1951). None had relapsed and all had been better in every respect than when they had liver extract. Our patients receiving the larger dosage showed higher hæmoglobin and erythrocyte levels, but we recognised that this point needed further investigation. In later years, therefore, doses were varied upwards and downwards, though none was reduced from the higher levels to 20 μg. per month. No significant change in red-cell level was produced in any of the groups except when the 20 μg. dose was increased to 200 μg. (A change of 0·5 million red cells per c.mm. was regarded as significant.)

Table I sets out the changes in erythrocyte levels after variations in vitamin-B_{12} dosage in a group of 32 patients during the period 1950–1954.

34 patients (24 who had been having 40 μg. per month and 10 who had been having 80 μg.) were treated for two years with 1000 μg. per month, but no significant change in hæmoglobin and red-cell levels was apparent from this large increase.

From these observations it was concluded that increase of the dose beyond 100 μg. per month is unlikely to be beneficial; and, in fact, during a period of five years, no relapse occurred in any of 43 patients treated throughout with 100 μg. by intramuscular injection. The results of treatment during 1953 with doses of 100 μg. and 1000 μg. per month are set out in table II.

During five years 180 patients were under observation, 119 of them throughout the period. All were treated with intramuscular injections of vitamin B_{12} in doses of 20 μg. per month, or more, and none relapsed—relapse being defined as a red-cell level persistently below 4·0 million per c.mm. This experience was unprecedented in the history of the clinic.

B_{12} by Mouth

Megaloblastic anæmia has been treated successfully with vitamin B_{12} by mouth. Chalmers (1954) and Heathcote and Mooney (1958) give extensive references to the literature concerning the relation of vitamin B_{12} to Castle's factors and its use in the oral treatment of pernicious anæmia (see also *Lancet* 1957, 1958).

During 1955 and 1956 the patients attending the clinic were divided into two groups—the one treated with 100 μg. B_{12} once a month by intramuscular injection, the other with 100 μg. daily by mouth.

The oral preparation was an elixir containing 50 μg. per teaspoonful. Each patient was supplied with a standard teaspoon and was instructed to take two teaspoonfuls each morning on wakening and to take no food or drink for one hour afterwards. The elixir was supplied in bottles each containing enough for a month. At each visit to the clinic hæmoglobin and erythrocyte estimations were made: the patient was

TABLE III—EFFECTS OF ORAL AND INTRAMUSCULAR TREATMENT COMPARED

Erythrocytes (million per c.mm.)	Patients receiving 100 μg. per day * by mouth	Patients receiving 100 μg. per month by injection
4·0	2 (3%)	5 (6%)
4·5	18 (25·5%)	31 (37%)
5·0	30 (42%)	26 (31%)
+5·0	21 (29·5%)	22 (26%)
Total	71	84

* Dose varied between 100 and 150 μg. per day.

supplied with enough elixir to last two months and was told to return at the end of that time. Even though a standard measure was supplied, consumption of the elixir varied between two and three bottles in the two months; but no patient consumed less than one bottle per month.

On this regime no patient relapsed, and the hæmoglobin and red-cell levels of the two groups, compared in table III, show no significant difference. Certainly it is quite clear that the oral group fared no worse than those receiving intramuscular injections.

In a number of patients from each group the vitamin-B_{12} level of the serum was assayed at the end of the two years. (Unfortunately, a month before the samples were collected for assay, some of those receiving parenteral treatment had been given a supplement of 10 mg. of folic acid daily.) Blood samples were collected from the parenteral group immediately before an injection. The assays were carried out by Dr. N. K. Shinton at the Queen Elizabeth Hospital, Birmingham. The results (table IV) support the

TABLE IV—ASSAYS OF VITAMIN B_{12} IN SERUM

Vitamin B_{12} (μμg. per ml. serum)	Oral group	Intramuscular group	
		Vitamin B_{12} only	Vitamin B_{12} +folic acid
100–200	1	2	..
200–300	12	10	4
300–400	6	2	4
400–500	1	..	1
500–600	..	..	..
600–700	..	..	2
700–800	..	1	..
800–900	..	..	..
900–1000	..	..	1
Total	20	15	12

previous conclusion that there is no significant difference between the two groups.

We hoped to carry this investigation further by continuing the fasting oral treatment of the one group and changing the intramuscular group to oral treatment along with a meal. But the experiment had to be ended before this could be done.

Summary and Conclusions

For maintenance treatment in pernicious anæmia a monthly intramuscular injection of 100 μg. of vitamin B_{12} was entirely satisfactory. No advantage in a higher dose has been apparent.

Over a period of two years a group of 71 patients taking a daily dose of 100 μg. by mouth an hour before breakfast were maintained at least as well as a group of 84 patients receiving a monthly intramuscular injection of 100 μg.

Thanks are due to the clinical staff of the Royal Berkshire Hospital for free access to patients and to Dr. N. K. Shinton, of the Queen Elizabeth Hospital, Birmingham, for the serum-B_{12} estimations. Supplies of liver extracts and vitamin B_{12} preparations, together with much help and encouragement, have been given by Messrs. Glaxo Laboratories.

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THE MANAGEMENT OF DUODENAL-STUMP FISTULA

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AN external fistula arising from a leaking duodenal stump increases the morbidity and mortality of the Polya-type gastrectomy. The true frequency of this complication is unknown, but the number may be increasing now that emergency gastrectomy is performed more often. Most of these fistulæ heal spontaneously on conservative treatment, although they require prolonged and often difficult nursing care. A minority of patients get worse and finally succumb.

The principles of management—suction of the fistula-fluid, protection of the skin, and general supportive therapy—have been well summarised by Bartlett and Lowell (1938). The cases to be described illustrate some of these principles and show the importance of posture.

Dangers of Duodenal Fistulæ

Duodenal juice plays a vital role in the digestion of proteins and fats.

Erepsin, secreted by the small intestine, may act on small peptone molecules, but whole protein can be broken down only by pancreatic trypsin or by the weaker gastric pepsin. The latter is much reduced by gastrectomy. Fat breakdown and absorption is impaired by the combined loss of bile and of pancreatic lipase.

Loss of duodenal juice thus leads to negative nitrogen balance, reduced calorie intake, and rapid loss of weight. Water and electrolyte imbalance results, moreover, from loss of sodium chloride and of alkaline fluid. Finally, duodenal juice contains a mixture of enzymes which, under suitable conditions, can digest the skin. All three of these hazards are directly proportional to the volume of fluid lost through the fistula.

Choice of Treatment

Whether the fistula is initially treated by operation or by conservative methods depends largely on its type and mode of presentation.

If the initial fistula volume and the character of the stools suggests a complete or near-complete obstruction of the afferent loop, then the treatment is early surgical correction. Where there is no obstruction, conservative treatment is the method of choice (Brown et al. 1950).

The fistula may present in one of three ways. First, if the abdomen has been drained at gastrectomy, the duodenal contents may appear through the drainage-tube. Second, they may appear spontaneously through the abdominal wound. Third, the fistula may follow drainage of a subphrenic abscess.

In 3 of the 5 cases here presented the fistula arose insidiously, the duodenal contents were mixed with pus, and the track was slow in forming. The true nature of the discharge was recognised only after the skin had become excoriated and when biochemical tests showed the presence of both bile and pancreatic enzymes. These tests also helped to distinguish duodenal from purely pancreatic or biliary fistulæ.

Conservative Management

All cases were treated conservatively—that is, the original Polya-type anastomosis remained intact.

Feeding the Patient

Since closure of the fistula may take a considerable time—the average in the present series was twenty days—it is essential that the patient should be fed and that the food should be absorbed. The food was given by mouth

whenever possible, but jejunostomy was considered both in the early and in the later phases of the illness. If, at the onset, methylene-blue given by mouth appeared in the fistula fluid, a jejunostomy was performed to ensure that the fistula was not aggravated or maintained by oral feeding. Indications later were progressive loss of weight and large volumes of fistula fluid. Duodenal contents and food were then returned together through the jejunostomy to avoid the discomforts of prolonged nasogastric intubation. Jejunostomy was unnecessary after the fistula volume was reduced by posture.

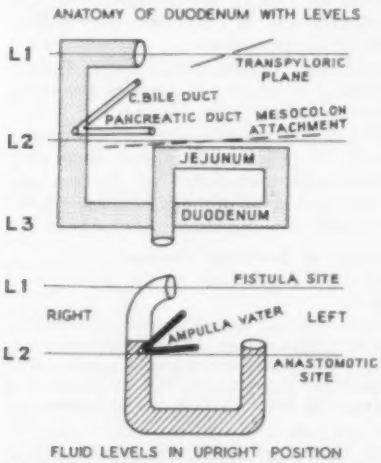

Fig. 1—Anatomy of the duodenal stump after retrocolic gastrectomy.

Posture

The anatomy of the duodenal stump after a retrocolic gastrectomy is shown diagrammatically in fig. 1. The duodenum with the afferent and efferent limbs of the anastomosis may be likened to a "U", with the stump at the level of vertebra L1 and to the right, the anastomosis in the mesocolon at the level of L2 and to the left, and the ampulla of Vater between them. The actual levels are, of course, inconstant; but the duodenal stump is retroperitoneal and fixed, the anastomosis is intraperitoneal and mobile, and their anatomical relationship can be influenced by posture. After a retrocolic gastrectomy hydrostatic pressure will tend to keep the stump dry so long as the patient is in the vertical position; and, after both antecolic and retrocolic anastomosis, so long as he remains lying on his left side with the head of the bed well raised.

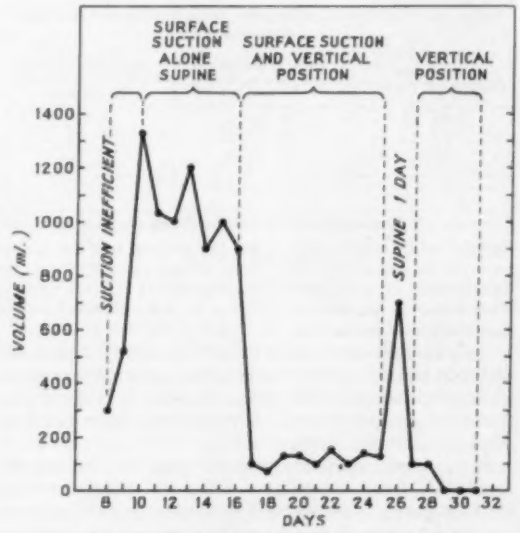

Fig. 2—Variations in fistula volume in case 1.

The influence of the vertical and raised lateral positions on the fistula volume is shown in figs. 2–4. That the diminishing loss was not due to spontaneous healing was shown when the patients were nursed supine for one day. During that day their fistula volumes significantly increased. Since weakness is one of the reasons why patients have to lie flat, and since the supine position increases their fistula volumes every effort should be made from the start to prevent their losing weight and to maintain their strength (fig. 5).

Surface Suction

Efficient collection of fistula fluid is important for three reasons. First, to assess the volume of fluid lost through the fistula; second, to allow the discharge to be returned to the alimentary tract; and finally, to prevent skin excoriation. The surface-suction equipment should not be liable to kinking, it should require little nursing

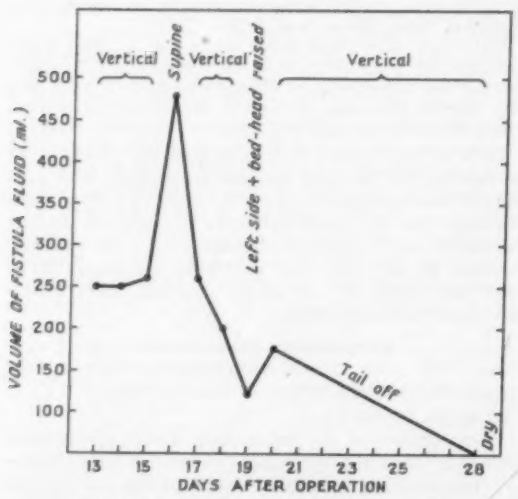

Fig. 3—Variations in fistula volume in case 2.

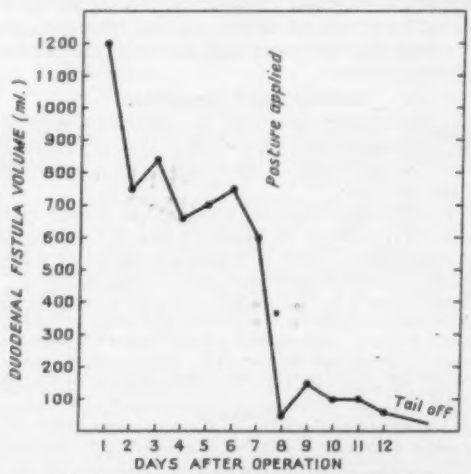

Fig. 4—Variations in fistula volume in case 5.

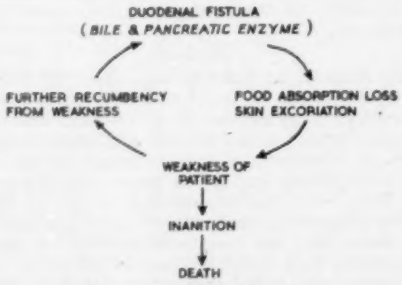

Fig. 5—The cycle of events.

attention, it should be able to drain off spurts of fistula fluid, and it should not maintain the patency of the duodenal stump. Suction therefore must not be through a single hole, and the tube should abut on the skin opening and not lead directly into the tract. The appliance shown in fig. 6 can be made from polyethylene sheet which cuts with scissors and melts easily under red heat.

When the fistula followed drainage of a subphrenic abscess, sump suction was satisfactory. This might also have been used had any of the fistulæ appeared through the track of the original drainage-tube. In my experience, when the fistula arises spontaneously the tortuosity of the tract precludes its use. A modification of Farquharson's (1954) rubber-catheter suction can be used instead.

The short, oblong perforation is made in the concavity of the bend, so that maximal suction is nearest the fistula's surface opening. When this first perforation becomes immersed in a spurt of fluid, suction continues through the more distal holes (fig. 7).

Protection of the Skin

The most important means of preventing excoriation of the skin is efficient suction. Once this was established in our patients the type of dressing to the skin depended on whether excoriation had already started or not. To the intact skin any protection could be applied—for example, 'Sleek', 'Durafix', or aluminium paste. In most cases, however, excoriation had already begun and a wet, weeping surface failed to hold impervious dressings. Buffer-paste, which acts by maintaining an unfavourable pH for the action of duodenal enzymes, gave little protection and was itself an irritant. Diluted skimmed milk, on the other hand, by virtue of its protein, fat, and sugar content, competed with the skin for the enzymes of the fistula fluid, and it was capable of healing excoriated skin or of preventing excoriation. It also relieved all burning discomfort. Whether the milk was applied as soaks or by actual irrigation depended on the degree of excoriation or on the tendency to excoriation.

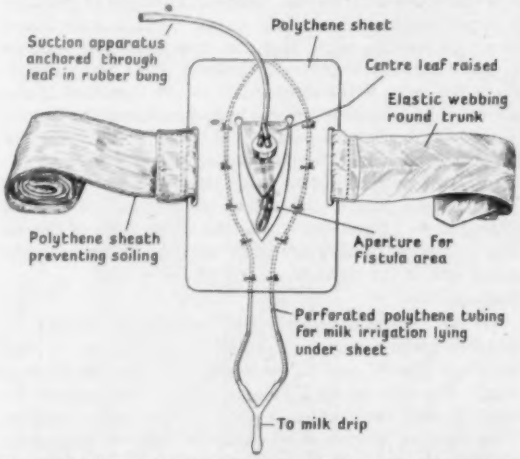
Suction apparatus anchored through leaf in rubber bung
Polythene sheet
Centre leaf raised
Elastic webbing round trunk
Polythene sheath preventing soiling
Aperture for Fistula area
Perforated polythene tubing for milk irrigation lying under sheet
To milk drip

Fig. 6—Appliance which exposes the fistula, anchors surface-suction, provides milk irrigation to the skin if necessary, and generally facilitates nursing. Exposure prevents the pooling of enzymes at an "incubating" atmosphere around the fistula opening.

Case-reports

Case 1.—A man aged 31 developed a duodenal fistula after a retrocolic gastrectomy for an acute-on-chronic duodenal ulcer. The fistula presented spontaneously through the abdominal wound. The nature of the discharge was recognised biochemically and the methylene-blue test was negative. At first the fluid volume from the fistula was not large, and the patient was treated conservatively without returning the collected duodenal contents. He lost weight gradually and the fistula fluid increased. Jejunostomy was performed on the eighteenth day after the appearance of the fistula. In retrospect this operation should have been done earlier; even in this relatively short period loss of weight was considerable. The jejunostomy feeding required careful management; otherwise a sprue-like syndrome developed.

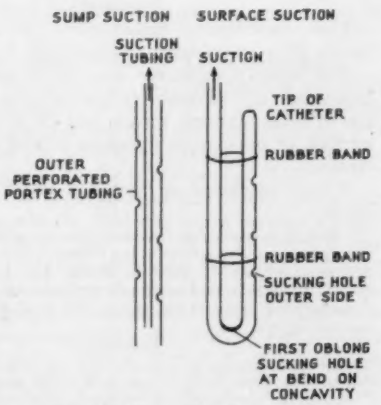

Fig. 7—Sump and surface suction.

The patient did not gain weight and he had no formed stools unless the collected fistula fluid was returned mixed with his jejunostomy feed; and intestinal hurry could only be avoided by giving it in the form of a drip. Before feeds the collected fistula fluid was stored on ice, mixed with milk and a proprietary food ('Complan'); and the whole was pasteurised before administration. This lessened the risk of enteritis without denaturing the important pancreatic enzymes. The skin—at first greatly excoriated—was healed by milk irrigation and surface suction. Later suction and milk-soak dressings were adequate. The response of his fistula volume to posture is shown in fig. 2. On this regime the fistula dried after fourteen days.

Case 2.—A man aged 66 developed a duodenal fistula following retrocolic gastrectomy for hæmorrhage. He was nursed in the vertical position from the onset, the methylene-blue test was negative, and oral feeding without intravenous therapy could be maintained throughout the illness. The effect of posture is shown in fig. 3. The skin was adequately protected by milk-soak dressings, changed three times in twenty-four hours.

Case 3.—A man aged 51 presented with stump leakage during drainage of a subphrenic abscess after antecolic gastrectomy. Sump suction was instituted and the unexcoriated skin around the tube was protected with durafix. The fistula fluid was not much increased by a twelve-hour trial with the patient supine, but the lateral position was not tried. The average daily loss of duodenal contents was 350 ml. Weight was maintained on oral feeding, and the fistula healed with little difficulty.

Case 4.—A man aged 39 presented with a stump fistula after a retrocolic gastrectomy. He was nursed in the vertical

position from the beginning. The fistula volume was very small throughout and healing took place in sixteen days. The fluid loss from the fistula was not measured in the supine position.

Case 5.—A man aged 44 was admitted for partial gastrectomy because of chronic duodenal ulcer. After a difficult antecolic Polya-Hofmeister gastrectomy a subphrenic abscess developed which was explored on the eighth postoperative day. It was found to contain duodenal contents. Sump suction was applied to the space adjacent to the duodenal stump. The skin wound was closed around the sump drainage-tube. The skin was protected with a cellulose-spray dressing and was exposed to the air. The methylene-blue test was negative, and the patient was fed fully by mouth. In the early postoperative management a feed prepared from collected duodenal contents (made up to 1 litre) was dripped by an intranasal tube by night. On the 8th day of suction the patient was turned from the supine to the left lateral position with the head of the bed well raised (fig. 4). After eight days' posture the fistula had dried. The patient was discharged, with all wounds healed, on the twenty-fifth day after the original gastrectomy. At no time was the skin excoriated.

Summary

The conservative management of duodenal-stump fistulæ after gastrectomy is discussed.

The aims of treatment are: (1) to provide adequate food and to ensure its absorption; (2) to reduce by posture loss of fluid from the fistula; and (3) to protect the skin by milk or impervious dressings and by efficient surface suction.

A new appliance is described which makes nursing easier.

I wish to acknowledge with gratitude the advice and encouragement given in the treatment of the patients and in the preparation of this paper by Mr. K. Paterson Brown, Mr. J. R. Cameron, and Mr. T. J. McNair, and to express my thanks to Mr. H. Porter for demonstrating case 3 to me, and to Mr. A. E. Stevens for allowing me to treat case 5.

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PROGNOSIS OF LIMB INEQUALITY FOLLOWING PARALYTIC POLIOMYELITIS

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SHORTNESS of one leg following an attack of poliomyelitis in childhood is related in general to asymmetry in the residual lower-limb paralysis. Strictly unilateral involvement in poliomyelitis is rare; but the limbs are usually affected unequally, and recovery in the more paralysed member is usually slower and less complete. In the first year after the onset of the disease the more paralysed leg is often the longer (Ring and Ward 1958), but as time passes the growth of this leg is reduced and it becomes relatively shorter. In some patients this shortening is slight and of little importance, and it often makes walking easier. In others, where the shortening is more severe, the inequality of leg length may be the major clinical problem. In a few the growth of the paralysed leg is grossly retarded, and the limb may end up as a useless and withered appendage.

Exactly why bone growth is depressed after poliomyelitis is undecided, but in most patients the disturbance of growth appears to be proportional to the difference in muscle power between the legs. Stinchfield et al. (1949) used this difference as the basis of a table for predicting limb equality, but the method is cumbersome and not very accurate.

Method

At the Hospital for Sick Children, Great Ormond Street, radiographic records of limb length after poliomyelitis have been kept for many patients since 1950, and some of these measurements have been made annually for many years. In addition to assessment of muscle strength, relative wasting of the limbs, and leg length, each patient attending the orthopædic clinic with residual weakness of one or both legs following poliomyelitis has had a scanogram performed at least once. Bone length has been measured from the upper part of the femoral head to the intercondylar notch, and from the intercondylar notch to the upper surface of the talus; the second measurement is taken as an indication of tibial length. By expressing bone lengths separately, the difficulties of variations in the tibiofemoral angle at the knee are overcome. Although the growth of the foot is also disturbed after poliomyelitis, accurate measurement of its growth is difficult, and this measurement is not included.

In this series 115 patients have been studied, and, with the exception of the occasional patient with hip or knee contractures, the correlation between clinical and radiographic measurements have been very close. Treatment of limb inequality at this hospital has been confined to epiphyseal stapling or epiphyseodesis, and these operations have rarely been performed before the age of 10 years. The 23 patients who were subjected to surgical correction have been considered only from the viewpoint of the preoperative growth of the leg.

The present reappraisal of these patients has been concerned with the progress and prognosis of limb inequality. Shortening of the leg and disability do not go hand in hand; and it would be rash to suggest that there is a level of inequality which can be ignored, and one which must be considered for surgical correction.

Shortening

Distribution

In most patients the relative shortening of the more paralysed leg affects the tibia to a greater extent than the femur, roughly in the proportion of 3 : 2. The distribution of shortening in the present series was as follows:

Tibia greater than femur	*Equal*	*Tibia less than femur*
92	2	12

Whether the distribution of paralysis influences this differential disturbance of growth is difficult to determine. It is undoubtedly true that complete paralysis of muscles is commoner in the calf than in the thigh, but measurements of wasting show that the loss of muscle bulk is virtually equally distributed between these two regions. Since the mass of the normal calf is less than that of the normal thigh, the proportional loss of muscle in the former is greater. A selective paralysis of the thigh muscles may be associated with a preponderance of shortening in the femur, or may result in the tibia being the more affected. This suggests that, whilst overall wasting may be directly related to the overall shortening, the distribution of muscle loss within the limb plays little part in determining the actual site of the shortening.

Progress

In the clinical examination of patients the impression is often gained that established shortening in a limb does not change over many years. For the detection of small changes in limb length serial scanograms are undoubtedly more accurate than clinical measurements. There are 44 patients in whom more than one scanogram at intervals of a year or more are available. The progress of shortening in these patients was as follows:

Progressive shortening	*No change*	*Diminished shortening*
38	4	2

The significance of the small number of observations in which the shortening is either diminished or has not changed over the period of a year is not very great since these were patients in whom the difference between the two limbs was minimal. Undoubtedly in the vast majority of patients the discrepancy between the lengths of the limbs increases during the whole of the period of growth.

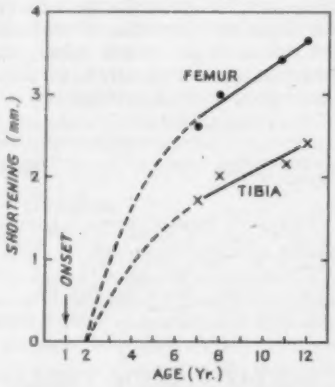

Fig. 1—Course of shortening in a child with unequal leg paralysis; onset at 1 year of age.

When the shortening of the limb is plotted against the age of the child, the increase of inequality over the period of study is roughly linear (fig. 1). Regression of the line back to the base should indicate the age of onset, but this was in almost all cases considerably later than predicted by this method. The only explanation which can be advanced is that shortening during the first few years after onset increased at a rate somewhat greater than in the later years. Such a conclusion can be reached in a rather different fashion from patients with only a single scanogram. If for each patient the annual increment of shortening is produced by dividing the total shortening of the limb by the number of years since onset, those patients who have been measured within a few years of the onset of the disease can be compared with those who have been examined very much later. Fig. 2 shows that the annual index of shortening is greatest in the first few years after onset. Since it has already been shown that lengthening rather than shortening of the more paralysed limb is the commoner phenomenon during the first year after onset, difference between the lengths of the limbs must develop very rapidly after this initial lengthening. How far this is due to the more rapid growth of the limbs in the younger child and how far it is due to the effects of paralysis and subsequent adaptation to them cannot be determined from the present data.

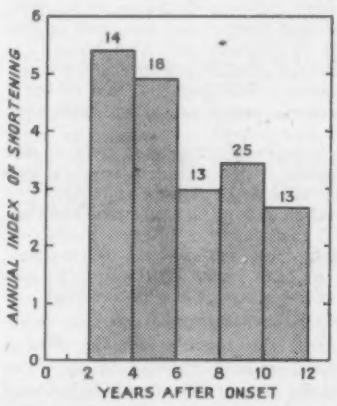

Fig. 2—The annual index of shortening, showing that this index tends to be greater soon after the onset of the disease. Inset figures indicate the number of patients.

Influence of Age of Onset

In a study of 88 patients with an onset of poliomyelitis in childhood, Gullickson et al. (1950) found that amount of shortening, expressed as a percentage of the growth of the normal limb, was uninfluenced by the age of onset, provided this was below 10 years. In the present group of patients similar conclusions can be drawn. The annual index of shortening, derived by dividing the total shortening by the number of years since onset, is surprisingly constant, regardless of the age of the patient, as the following figures show:

	Age of onset (years)				
	Under 1	*1*	*2*	*3–4*	*5–8*
No. of patients	20	30	26	19	9
Mean of annual index of shortening (mm.)	4·4	3·5	4·0	4·0	5·5

This observation of course does not indicate that the *final* shortening is independent of the age of onset, since the discrepancy will increase with each year that the child has to grow. Poliomyelitis in the first year or two of life may result in very severe shortening, which will increase for the whole of the 12 or more years of growth. As has been shown earlier, shortening develops rapidly during the second and third year after onset, and thereafter less rapidly, and this distribution tends to conceal the age factor.

Residual Muscle Loss and Limb Inequality

It has been shown (Ring 1957) that there is in general an association between the extent of the residual paralysis of a limb and the subsequent growth disturbance. As a rule, the greater the difference in muscle power between the legs, the greater the final shortening. Ratliff (1957) has questioned the importance of this association because of the wide range in the final shortening between subjects with a similar muscle loss. The range, however, is considerably less when measurements of the thigh and calf circumference, rather than formal muscle tests, are made. In the present group of patients there were none in whom there was demonstrable shortening without either muscle weakness on ordinary clinical testing or relative wasting of the shorter limb. It seems unlikely, therefore, that growth will be significantly disturbed if recovery is complete. Similarly there have been no patients followed for five years or more who have not exhibited shortening of the more affected limb; and it appears that provided the onset of poliomyelitis occurs during childhood, and provided paralysis is unevenly distributed between the legs, shortening will always ensue. When one leg is normal, or virtually so, the analysis of residual shortening and its relation to muscle wasting presents no difficulty. When both legs are severely paralysed it may occasionally be difficult to ascertain which is the more affected limb, and shortening in these patients tends to be capricious. In the present series of patients severe paralysis of both legs was rare.

Prognosis

In considering the course of limb inequality in the paralysed child certain variable factors must be considered. It has previously been shown that the initial effect of limb paralysis is to produce an acceleration of leg growth, and only towards the end of the second year after onset does shortening tend to occur. The discrepancy between the legs will then advance rapidly for perhaps two or three years, and then less rapidly until epiphyseal closure occurs. Thus the age of onset of the disease plays a part in the final inequality of the limbs.

In the early stages of poliomyelitis both legs tend to be involved, although usually one is more severely affected than the other. The residual paralysis in the legs may be strictly unilateral to ordinary clinical testing, or may be distributed evenly or unevenly between the

limbs. Occasionally gross hypertrophy of the unaffected leg occurs, making the muscle asymmetry even greater. The number of variable factors in the distribution of the permanent paralysis in the limbs gives rise to difficulty in the use both of muscle wasting or standard muscle testing in the prediction of limb inequality.

From the clinical management of these patients three distinct groups tend to emerge: (1) those in whom shortening is slight and insignificant; (2) those with progressive disturbance of growth which is roughly in proportion to the extent of the muscle loss; (3) those with severe and disproportionate shortening.

Most patients with poliomyelitis affecting the legs undoubtedly fall into the first group. The muscle loss in these patients is usually small; often recovery, judged by simple muscle testing, is complete although measurement of thigh or calf will usually reveal a small difference between the legs. The shortening often passes unnoticed, and may be disguised by a contracture of the tendo Achillis.

Of the patients who present with moderately severe muscle loss in the legs, with perhaps 2–3 in. of wasting of thigh or calf, most will fall into the second group. The disturbance of growth is progressive, and is in general terms related to the severity of the muscle loss. The final inequality in length cannot be accurately predicted in this group. Shortening tends to be between 1 in. and $2^1/_2$ in. at maturity, and in some patients will require surgical correction. Apart from the severity of the paralysis, onset in the first year or two of life appears to have a poor prognosis.

The detection of the group of patients with severe shortening, out of proportion to the muscle loss, presents some difficulty in the early stages. In these cases the leg is not usually completely flail; neither does it present evidence of an excessive circulatory disturbance. It tends to be regarded by the patient as a useless appendage, and is rarely used for weight-bearing even if a calliper is provided; and the ultimate shortening may reach 4–5 in. It is difficult to escape the conclusion that some additional disturbance of the growth mechanism has been superimposed upon that normally due to paralysis. These limbs are superficially similar to those showing gross shortening after tuberculosis of the hip. Ross (1948) and Parke et al. (1949) showed that in tuberculosis of the hip shortening is due to a premature epiphyseal fusion of the knee, affecting either the tibia or the femur, or both, but sparing the fibula. Sissons (1952) found that this is associated with gross decalcification of bone, and a similar osteoporosis in poliomyelitis might permit damage to the epiphyseal plate without producing complete epiphyseal fusion.

Summary

In lower-limb shortening following poliomyelitis in childhood, the tibia is affected more than the femur, regardless of the distribution of paralysis.

Shortening is almost always progressive throughout childhood, tending to develop rapidly for the first few years after onset and thereafter less rapidly.

The age of onset of the disease has little influence on the annual increment of shortening, but influences the final inequality in view of the number of years to maturity.

Clinically three groups of patients can be distinguished: (1) those with minimal residual muscle loss and minimal shortening; (2) those with shortening of $1–2^1/_2$ in., the extent of which is roughly proportional to the difference in muscle power between the legs; (3) a small group in whom the shortening is severe and out of proportion to the paralysis. In this third group some factor other than muscle loss appears to be responsible for the gross depression of epiphyseal activity.

It is a pleasure to record my thanks to Mr. G. C. Lloyd-Roberts for permission to examine and report on patients under his care. This work has been assisted by a grant from the Fund for Poliomyelitis Research.

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ACETAZOLAMIDE THERAPY IN EPILEPSY

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ACETAZOLAMIDE ('Diamox') has been advocated in the treatment of epilepsy since 1952 but reports of its value have been conflicting. Bergstrom et al. (1952), Merlis (1954), Golla and Sessions Hodge (1956), Ansell and Clarke (1956), and others have reported favourable results in some patients. On the other hand Livingston et al. (1956) found it to be ineffective in epileptic children. In this paper I describe the results of acetazolamide treatment in 63 epileptics.

The Trial

The patients in the trial were not particularly selected. They were a group of outpatient epileptics whose condition had been unsatisfactorily controlled with other anticonvulsants. There were 33 females and 30 males. The duration of the epilepsy varied from two to thirty-six years.

The patients fell into three groups—"idiopathic" epilepsy (41), temporal-lobe epilepsy (12), and miscellaneous (10).

The diagnosis of *idiopathic* (constitutional or cryptogenic) epilepsy was based on the usual criteria for petit mal and/or grand mal in patients without physical signs, and it was supported by a positive family history of epilepsy in 18 (45%) of the 41 patients. The electroencephalogram (E.E.G.) showed characteristic bilateral wave-and-spike discharges in 30 cases. In 6 the clinical diagnosis of epilepsy was supported neither by the family history nor by a characteristic E.E.G., though the E.E.G.s all showed bilateral, symmetrical, non-specific abnormalities. There were 17 children with petit mal, and all but 1 had typical bilateral, symmetrical, 3 per second wave-and-spike discharges in the E.E.G.

A diagnosis of *temporal-lobe* (psychomotor) epilepsy was based on the type of attack, together with a temporal-lobe focus in the E.E.G. None of these 12 patients had evidence of organic disease on clinical grounds or on radiological examination of the skull.

The *miscellaneous* group included patients with variable types of epilepsy due to birth injury (2), trauma (3), and epiloia (1), and there were 4 others of doubtful ætiology.

The state of each patient before acetazolamide treatment was assessed from the records and the clinical history. Previous anticonvulsant therapy, if any, was continued, unchanged for at least one month before and during the trial.

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Acetazolamide was given in doses of 750 mg. daily, sometimes starting with a smaller dose of 250 mg. and later increasing. Children under twelve received 125 mg. increasing to 500 or 750 mg. daily. Progress was assessed from charts recording the number of fits, together with the history from the patient, and also when available from the relatives. The trial lasted from two to six months.

7 other epileptics were given dummy tablets under similar conditions as controls.

Results

The 7 control patients showed no response to the dummy tablets. However, the history and the daily records of fits did not always agree. 2 patients thought they were having fewer attacks, but their charts showed that they were continuing at the same frequency. Daily variation in the frequency of petit mal was considerable, and quite often the records were largely compiled by guesswork. In view of these observations evidence of improvement had to be carefully assessed.

The table shows the results in the 63 patients who were given acetazolamide. The patients with idiopathic epilepsy are divided into those with petit mal only, those

RESULTS OF ACETAZOLAMIDE THERAPY IN EPILEPSY

Type of epilepsy	No. of patients	Effect		
		Nil	Temporary	Prolonged
Idiopathic:				
Petit mal alone	11	10	—	1
Petit mal and infrequent grand mal	12	10	1	1
Frequent grand mal and petit mal	18	18	—	—
Temporal lobe	12	11	1	—
Miscellaneous	10	10	—	—

with petit mal and infrequent grand mal, and those with frequent grand mal and petit mal.

The 2 patients with petit mal in whom the response was prolonged were boys aged eleven and twelve. Both had an average of 3–6 petit-mal attacks daily which were abolished by acetazolamide. The petit mal recurred when the drug was stopped, and later, when acetazolamide was given again, both remained free of attacks for over a year. There was nothing characteristic about their attacks or E.E.G.s to distinguish these children from those who did not respond, but it may be significant that both were at the age when petit mal may cease spontaneously. 2 patients showed a temporary reduction in the number of attacks for a few weeks when acetazolamide was first given, but then returned to their usual condition; increasing the dose had no effect.

8 of the 25 menstruating female epileptics thought their fits were related to the periods. None showed any convincing response to acetazolamide; 2 said they felt better generally, but their epilepsy continued at the same frequency.

There were no serious toxic effects. 5 patients complained of minor symptoms such as nausea, dizziness, tingling in the extremities, and glare.

Conclusions and Summary

63 epileptic patients were treated with acetazolamide. It appeared to be helpful in 2 of 17 children with petit mal. Acetazolamide had no effect in 46 adults (24 with petit mal and grand mal, 12 with temporal-lobe attacks, and 10 with miscellaneous forms of epilepsy), nor on epilepsy related to menstruation. From the results of this trial it is concluded that acetazolamide is of no value in the management of chronic adult epileptics, and is seldom of value in children with petit mal.

I wish to thank Dr. Denis Williams for advice, and Dr. June Dickson for help in interpreting the E.E.G.s. The dummy tablets were supplied by Lederle Laboratories Ltd.

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DEFIBRINATION SYNDROME IN PREGNANCY
VALUE OF VARIOUS DIAGNOSTIC TESTS

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REGISTRAR IN OBSTETRICS

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AMONG the complications of the late stages of pregnancy is a syndrome which used to be referred to as " obstetric shock ". This is usually associated with accidental retroplacental hæmorrhage, the retention of a dead fœtus, or the presence of amniotic-fluid emboli in the lungs. The onset is sudden and there is, in some instances complete breakdown of the normal hæmostatic process with the development of a severe hæmorrhagic state. This is characterised by apparent loss of blood-fibrinogen and requires prompt treatment. Many instances of this syndrome have been reported, and a wide variety of diagnostic tests have been used; but laboratory methods for assessing the response to therapy have received little attention (Reid et al. 1953a and b, Weiner et al. 1953, Moore 1954, Barnet and Cussen 1954, Sawitsky et al. 1954, Jackson et al. 1955, Barczak 1955, Albrechtson et al. 1955, Bonsnes and Sweeny 1955, Kimbell and Ghosh 1956, Fitzgerald and Jackson 1956, Pritchard 1956, Hjort 1956, Stirland 1956, Bowman and Yelito 1957, Charles 1957, Stouffner and Ashworth 1957, Cook 1957).

To be of any use laboratory methods must be simple, specific, and rapid. We present here the findings in four cases of obstetric defibrination in the study of which a few simple laboratory tests gave reliable and specific results even in the most mildly affected patient. Although more than four cases have been encountered in recent years, the present series have been selected because they illustrate some important points in laboratory diagnosis.

Case-records

Case 1.—Para-2, aged 40. This woman was admitted as an emergency at $38^1/_2$ weeks with a partly revealed, partly concealed accidental antepartum hæmorrhage. She was profoundly shocked and the fœtal heart could not be heard. There was no history of toxæmia, but albumin was present in a catheter specimen of urine.

A routine test of clotting-time showed imperfect fibrin formation, and further laboratory investigation revealed a major coagulation defect (table I, case 1, 9 A.M.). Blood-transfusion was commenced and concentrated fibrinogen

TABLE I—RESULTS OF LABORATORY INVESTIGATIONS

Case no.	Time of sample	Whole-blood clotting-time*	Thrombin titre	Plasma thrombin clotting-time (sec.)	Pro-thrombin time (one-stage) (sec.)	Ammonium-sulphate fibrinogen level (units per 100 ml. plasma)	Biochemical fibrinogen (mg. per 100 ml.)	Platelets (per c.mm.)	A.H.G. assay (%)	Factor V assay (%)
1	9.00 A.M.	6′ 30″; trace fibrin only	0	180 +	40	2·5	250	18,200	29	..
	12.30 P.M.	..	1/32	..	20	5·0		12,000	43	..
	3.15 P.M.	5′, 5′, 6′, 7′ 10″	1/128	..	17	..		72,000	220	..
2	3.00 A.M.	..	0	180 +	..	5·0	..	..	..	..
	11.00 A.M.	4′ 45″, 4′ 45″, 5′	1/8	..	..	5·0	148	22,000	..	..
3	7.00 A.M.	4′, 4′ 15″, 4′ 30″	1/16	20·5	18	4·0	..	90,000	32	..
	11.00 A.M.	5′ 30″, 6′, ?14′, ?14′	1/8	21	25	7·5	298	47,000	32	..
	2.00 P.M.	4′, 5′, 5′ 15″	1/32	18	20	5·0	..	48,000	..	..
	7.30 P.M.	4′, 4′ 15″, 4′ 15″	1/128	11	15	5·0	..	..	..	..
4	3.00 P.M.	180 + ′	0	1300 +	120 +	1·0	29	90,000	0	25
	6.45 P.M.	4′, 4′ 30″, 4′ 30″	1/16	15	19	4·0	..	..	..	..
	10.00 P.M.	4′, 4′ 45″, 5′ 5″	1/64	12	16	5·0	192	41,000	..	50
Normal		4′–6′	1/64–1/128	10–12	12–15	4–15	150–300	150,000–300,000	50–150	100

′ = min. ″ = sec.

(Lister Institute) given. In 3 hours only partial correction of the coagulation defect had been achieved (table I, case 1, 12.30 P.M.) and therapy was continued.

6 hours after admission, after 7 pints of blood and 5·4 g. of fibrinogen had been administered, the coagulation function had been restored to normal (table I, case 1, 3.15 P.M.). At this time the patient was delivered spontaneously of a stillborn male child weighing 7 lb. 4 oz. There was a 30 oz. retroplacental clot.

Vaginal bleeding continued in diminishing amount for 4 hours after delivery. On the following day the patient was still anæmic (Hb 45%) and 3 pints of packed red blood-cells was transfused. No further complications ensued, and the patient was discharged on the 10th day.

Case 2.—Para-0, aged 38. This patient was first seen at 30 weeks of pregnancy when she was found to have mid pre-eclamptic toxæmia, no albuminuria, and normal renal function. Blood-pressure (B.P.) 140/90 mm. Hg. She was discharged after 2 weeks in hospital with B.P. 135/85. 3 weeks later she was admitted as an emergency with a partly concealed, partly revealed accidental antepartum hæmorrhage. The patient was shocked and no fœtal heart could be heard. A rough clotting observation test at the bedside showed no obvious coagulation defect, but more detailed laboratory tests showed a definite defect (table I, case 2, 3 A.M.). Blood-transfusion was commenced immediately, but no fibrinogen was given. No urine was present in the bladder. 8 hours later the coagulation defect was less severe but still persisted.

20 hours later, as the patient was elderly, was not in labour, and was oliguric, a lower-segment cæsarean section was performed; a stillborn female child was delivered. There was no evidence of any hæmorrhagic tendency at this time. A retroplacental clot weighing 30 oz. was present. After delivery there was complete anuria.

23 hours after delivery $1^1/_2$ oz. of urine were passed, in the subsequent 24 hours $6^1/_2$ oz., and in the following 24 hours 33 oz. Thereafter urinary excretion was normal.

A total of 6 pints of blood was given up to delivery.

The patient was discharged on the 16th day.

Case 3.—Para-3, aged 46. This patient was admitted as an emergency at 34 weeks of pregnancy because of a partly revealed, partly concealed retroplacental antepartum hæmorrhage. She was in labour and was having regular uterine contractions. There was no history of toxæmia, but the urine contained albumin.

She was shocked and the fœtal heart could not be heard. Blood-transfusion was commenced immediately, and immediate laboratory investigations revealed a mild defect of coagulation function (table I, case 3, 7 A.M.). 4 hours later the defect was greater (table I, case 3, 11 A.M.). 5 hours after admission the patient was delivered spontaneously of a stillborn male infant. There was a retroplacental clot, but only 20 oz. of blood was lost at delivery and in the immediate postpartum period.

After delivery the coagulation function slowly disappeared without fibrinogen being administered (table I, case 3, 2 P.M. and 7.30 P.M.). Over the whole period 5 pints of blood was administered. The patient was discharged on the 6th day.

Case 4.—Para-0, aged 20. This patient was admitted by the flying-squad at 32 weeks after what appeared to be an eclamptic fit. She was transferred to hospital under sedation and this was continued after admission.

24 hours after admission there was frank hæmaturia, and the patient began to bleed from the lips, tongue, gums, and nose. In addition venepunctures were followed by a persistent ooze from the puncture site, and several spontaneous skin ecchymoses developed. Laboratory investigation revealed a severe coagulation defect (table I, case 4, 3 P.M.). Blood-transfusion and administration of fibrinogen were started immediately, and coagulation function returned to normal in 7 hours after 5·4 g. fibrinogen and 8 pints of blood had been administered (table I, case 4, 6.45 P.M. and 10 P.M.). At this stage the membranes were ruptured, and after an 8-hour labour a live male child was delivered by low forceps operation. The child made good progress thereafter. The mother and baby were discharged on the 32nd day.

Laboratory Methods

The following methods were used as described by Biggs and Macfarlane (1957):

Clotting-time (Lee and White); prothrombin-time (one-stage) (Quick); ammonium-sulphate method for rapid estimation of fibrinogen; prothrombin two-stage test; prothrombin consumption index; bleeding-time (Ivy); assay of factor V; assay of fibrinolysin in plasma; antihæmophilic globulin assay (Biggs et al. 1955); platelet counts (Brecher and Cronkite 1950); plasma-fibrinogen (Micro-Kjeldahl method) (Harrison 1957).

TABLE II—TEST FOR INHIBITOR IN PLASMA DERIVED FROM CASE OF OBSTETRICAL DEFIBRINATION

Normal plasma vol.	Patient's plasma vol.	Saline vol.	Thrombin clotting-time (sec.)
1	..	2	8
1	..	4	11
1	..	8	12
1	..	16	14
1	..	32	25
1	..	64	63
1	..	128	125
1	2	..	9
1	4	..	10
1	8	..	12
1	16	..	15
1	32	..	21
1	64	..	30
1	128	..	38

Patient's plasma: thrombin clotting-time = 68 sec.
Normal plasma: thrombin clotting-time = 9 sec.
0·1 ml. human thrombin was added to 0·5 ml. of each mixture.

Thrombin Titre and Time

0·5 ml. platelet-free citrate plasma, prepared from both normal and patient's plasma, is serially diluted in doubling dilutions from 1/2 to 1/128. To each tube is added 0·1 ml. human thrombin (Biggs and Macfarlane 1957 [36 units per ml.]). The thrombin-titre is recorded as the highest plasma dilution containing a visible clot (normal titre 1/64–1/128. The clotting-time of the 1/2 dilution is determined for both normal and patient's plasma (thrombin-time). For this test the content of thrombin should be adjusted to give a normal clotting-time of 10–12 sec. Bovine thrombin (Maw, 50 units per ml.) can be used for this test but may be found to be less coagulant than human thrombin giving lower thrombin titre and longer thrombin clotting-times. This method is a modification of the original Schneider (1952b) test and is similar to the techniques described by Hjort (1956) and Bowman and Yelito (1957).

Assay of Plasma Levels in Plasma

Fibrin plate method of Astrup and Mullertz (1952). As plasmin is thermolabile all plasma samples were stored in ice until tested.

Assay of Proactivator Levels (J. P. Soulier [1957], personal communication)

This test is a measure of residual proactivator in plasma as assessed by the addition of streptodornase (Burroughs Wellcome, 10 mg. per ml.), containing streptokinase, to the patient's plasma (diluted 1 20) in the presence of excess bovine fibrinogen. The mixtures were clotted with bovine thrombin (Maw) 50 units per ml., and the time of clot lysis was determined in relation to the addition of thrombin.

Results

The results obtained in the tests in most common usage are summarised in table I.

TABLE III—THROMBIN CLOTTING-TIMES OF 25% AMMONIUM-SULPHATE FRACTIONS

Case no.	Time of sample	Clotting-time (sec.)
2	3.00 A.M.	75
	11.00 A.M.	21
Control		16
3	7.00 A.M.	23
	11.00 A.M.	27
	2.00 P.M.	20·5
	7.30 P.M.	10
Control		10
4	3.00 P.M.	1200+
	6.45 P.M.	34
Control		15

5 ml. 50% saturated ammonium sulphate is added to 5 ml. plasma. The precipitate is removed by centrifugation, redissolved in 5 ml. physiological, saline and dialysed against citrate saline at 4°C for 18 hr.

Whole-blood Clotting-time

The observation of whole-blood clotting-time is useful in the assessment of the clotting defect. The blood may either not clot at all or wisps of fibrin may appear at 6–10 minutes and disappear again. The second specimen from case 3 clotted, but the fibrin was so non-adhesive that it fell off the walls of the tube before the clotting-time was accurately recorded. These imperfectly formed clots may seem to disappear after tilting the tubes. This disappearance has been interpreted as lysis, but in our series the phenomenon has been due to contraction of ill-formed clots and not to lysis.

Whole-blood clotting-times should be estimated in small tubes of the standard diameter used for the Lee and White test and not in larger containers—e.g., universal containers. Only using standard conditions is it possible to assess accurately the quality of the fibrin clot once it has formed.

Thrombin Titre

This test has proved to be the most reliable and sensitive indicator of the defect in these syndromes. Normal plasma will produce a fibrin clot on the addition of thrombin when diluted 1 in 64 in saline, and the majority of plasma samples will clot when diluted 1 in 128. In three cases (table I) the addition of thrombin produced no clot when added to the 1/2 dilution of patient's plasma. Fibrinogen therapy produced a definite rise in titre, and when the patient's plasma clots at a dilution of 1 in 128 it can be assumed that the coagulation mechanism has returned to normal.

In case 3 this test indicated a defect in the presence of a normal quantitative and qualitative whole-blood clotting-time. It also indicated that a more severe defect was developing before delivery. After delivery the thrombin titre returned spontaneously to the initial level and to normal levels within 5 hours (table I).

Thrombin-time

Thrombin plasma clotting-times longer than normal have been found in these cases (table I), and probably this prolongation is the earliest evidence of defibrination. It has proved to be a less sensitive indicator of minor fluctuations in the severity of the syndrome than the thrombin titre.

One-stage Prothrombin-time

This test has been found to provide a sensitive indicator of the defect in these cases, but cannot be used as the sole diagnostic test as alterations in the levels of factor V, Stuart-Prower factor, factor VII, and prothrombin will also influence the results.

Rapid Estimation of Fibrinogen by Ammonium-sulphate Precipitation and by the Biochemical Method

The main advantages of the ammonium-sulphate precipitation method are its simplicity and speed. It has, however, shown normal or near normal results in three of the four patients. Only in case 4, the most severely affected patient, was an unequivocally abnormal result obtained.

It has been found that biochemical methods for estimating fibrinogen are too time-consuming to provide the rapid results so essential in the initial diagnosis of these cases. Further, it was only in case 4 that a dangerously low level of fibrinogen was found. In cases 1 and 3 (table I) levels of fibrinogen which would usually be considered adequate for normal hæmostasis were found in relation to quite definite defects indicated by other tests. The results of the biochemical method, with one exception, correlated closely with those of the ammonium-sulphate precipitation method.

Platelet-counts

All the cases described had thrombocytopenia (table I). In every instance the platelet-counts were below 100,000 per c.mm. during the acute stage of the syndrome. The platelet levels remained low after therapy had restored normal coagulation function and did not return to normal for 5–10 days. In certain instances platelet counting was difficult owing to the presence of much debris in the diluted count. This necessitated the use of phase-contrast microscopy to recognise whole platelets. The debris was not in the diluent and may represent fragmented platelets.

Other Tests of Coagulation Junction

Antihæmophilic globulin.—In three cases of this syndrome where levels of A.H.G. were determined at the height of the attacks, low levels were found, indicating that there is depletion of A.H.G. The levels of A.H.G. returned rapidly to normal after recovery.

Factor V was found to be reduced to levels of approximately 25% of normal when the coagulation defect was fully developed (case 4).

The prothrombin-consumption index reflected the low levels of coagulation factors other than fibrinogen. It was high in the two cases on whose blood the test was performed (cases 3 and 4).

Prothrombin, measured by the two-stage technique, was much reduced in case 4 but was increased above normal levels in case 1.

Fibrinolysis.—In no case was it possible to detect in the patient's blood any active fibrinolysin, as indicated by lysis of human and bovine fibrin. In one case evidence was obtained that there had been partial consumption of proactivator, measured by Soulier's test (case 4).

Bleeding-time.—In case 4 the bleeding-time was prolonged and this prolongation persisted until the 5th day after delivery, the platelet-count having returned to normal in 4 days.

Experimental Results

The remarkable feature of these investigations was the finding that the reaction of plasma to thrombin had little

relation to the fibrinogen levels determined biochemically after clotting with calcium or by ammonium-sulphate precipitation. This discrepancy suggests that either an abnormal inhibitor is present or the reactivity of the fibrinogen to thrombin is altered in some way.

The addition of a small proportion of normal plasma to the initial plasma samples of cases 1, 2, and 4 restored normal coagulation (table II). It therefore seemed unlikely that the failure to clot on the addition of thrombin was due to any specific antithrombin. The addition of toluidine-blue did not affect the results. The addition of normal serum failed to produce a clot from the plasma of cases 1 and 2, suggesting that there was unlikely to be a lack of an essential thrombin co-factor.

Plasma samples from all cases were treated with saturated ammonium sulphate to produce a precipitate at 25% saturation (25% fraction). Only in case 4 was no appreciable amount of precipitate obtained. After dialysis the precipitates obtained from cases 1, 2, and 3 clotted on the addition of thrombin but the clotting-times observed in cases 2 and 3 were longer than normal (table III). In the initial sample from case 4 no thrombin-clottable protein was present in the 25% fraction. From the general appearance of the clots it seemed impossible that the prolonged clotting-times could be attributed to simple dilution. These results appear to favour the view that the reactivity of fibrinogen is altered.

Discussion

Two theories have been advanced to account for the syndrome. That of Schneider (1951, 1952a) postulates that damage to the decidua or placenta liberates tissue-thromboplastins which produce intravascular clotting and thus defibrination when they gain access to the maternal circulation. Alternatively, others (Albrechtson et al. 1955, Soulier et al. 1956) believe that a tissue-fibrinokinase, liberated from the damaged tissue, activates the fibrinolytic system, which in turn destroys the circulating fibrinogen.

The laboratory findings in these four cases have tended to support the Schneider hypothesis, as all attempts to demonstrate active fibrinolysins have failed. The low levels of antihæmophilic globulin and factor v and the diminished number of circulating platelets support the concept that the defect in these cases was the result of an episode or episodes of intravascular coagulation.

Orthodox biochemical methods for estimating fibrinogen and the rapid ammonium-sulphate showed levels in three of the cases (cases 1, 2, and 3) which would not usually be considered dangerously low. The addition of purified thrombin to the same plasma sample disclosed a severe abnormality. A similar discrepancy was recorded by Scott (1955). The biochemical method relies on the conversion of fibrinogen to fibrin by the natural thrombin, ample time being allowed for the completion of fibrin formation.

Although the amount of fibrin obtained by this method may be little reduced, the poor quality of the clot in the clotting-time test (Lee and White) suggests that its formation may be abnormal. This, together with the slow reaction to thrombin observed in the ammonium-sulphate fractions (table III), suggests that, in the early stages of this syndrome, poor reactivity of fibrinogen to thrombin may be an important feature of the coagulation defect.

The nature of this altered reactivity remains obscure, but whatever the explanation the determination of the thrombin-time and thrombin titre are, in our experience, the most reliable tests for diagnosis of this syndrome and for assessing the response to therapy. The more orthodox biochemical methods, if used as the sole indicators of obstetrical defibrination, may be misleading.

In two of our cases (cases 1 and 4) the administration of concentrated fibrinogen (5·4 g.) was accompanied by rapid clinical improvement which was reflected in the laboratory tests. These results confirm previous reports of the value of fibrinogen therapy in this syndrome. The reaction of the patient's plasma to thrombin was found to be a reliable guide to the response to therapy, and it appears reasonable to suggest that fibrinogen therapy should be continued until the reaction of the plasma to thrombin returns to normal. Cases 2 and 3 recovered spontaneously without treatment. The coagulation defect of the cases treated with fibrinogen disappeared in a much shorter time than in those cases left to recover spontaneously (table I) despite the obviously greater initial severity of the syndrome in these cases (table I, cases 1 and 4).

The decision to use or withhold fibrinogen therapy for a particular patient must rest on general assessment of laboratory and clinical evidence. No definite rules can be formulated from laboratory results alone. When shock and hæmorrhage develop in the late stages of pregnancy, fibrinogen therapy is unlikely to be beneficial if the laboratory results show no evidence of defibrination. Other causes for this clinical state must always be borne in mind. The indiscriminate use of fibrinogen without laboratory evidence of defibrination has obvious dangers.

Blood was transfused in all cases in order to replace blood lost through vaginal and retroplacental hæmorrhage and to combat shock. It is difficult to assess exactly how much these blood-transfusions contributed to the correction of the coagulation defect.

In the four present cases the clinical and laboratory findings suggest that there had been one episode of defibrination before or shortly after admission from which the patient recovered either spontaneously or following therapy. It is impossible to be certain that this will be the outcome of every example of this syndrome, and precautions must always be taken to ensure that there is no further episode of defibrination after the return of the coagulation function to normal.

Summary

Four cases of obstetric defibrination are described. Laboratory study of their blood showed that tests based on the reactivity of plasma to purified thrombin were more reliable than other methods for detecting the abnormality.

The beneficial effects of concentrated purified fibrinogen has been confirmed.

The defect in the early stages of this syndrome may consist in a qualitative alteration in the reactivity of fibrinogen to thrombin, rather than a simple quantitative depletion of fibrinogen.

We wish to thank Mr. J. A. Stallworthy for permission to publish details of these four cases, and Mr. G. Higgins for the biochemical estimations of plasma-fibrinogen.

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EFFECT OF ATROPINE ON THE HEART-RATE

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DESPITE the widespread use of atropine, particularly in anæsthesia, there are still conflicting reports about its effects on the heart-rate. For example, Bain and Broadbent (1949) stated that intravenous atropine would slow the heart-rate before quickening it; whereas Hunter (1953) found, in anæsthetised patients, that atropine given in this way caused tachycardia without previous slowing. Lee (1957) and Doughty and Wylie (1952) recommend that an interval of fifteen to twenty minutes should be allowed for the maximum effect of intravenously administered atropine to develop; Hunter (1953) found that the maximum effect was reached in about two minutes. And there are many similar contradictions.

This drug can slow the heart by stimulating the vagus centre, and quicken it by paralysing the vagal nerve-endings (Krantz and Carr 1954, Goodman and Gilman 1955, Sollman 1957), and it seemed to us that the current confusion was the result of failure to appreciate that this dual action can give rise to different effects according to circumstance. The difficulty is not new. It led Platz (1922) to suggest that the effect could be predicted by taking into account the dose and route of administration. This statement prompted us to do some simple experiments; and the results of these, together with Platz's observations, reconcile the conflicting reports to which we have referred.

Findings

EFFECT OF DOSE ON RESPONSE

It has long been known that doses of atropine up to about 0·5 mg. slow the pulse-rate, whereas doses over about 0·6 mg. quicken it (Harris 1921, McGuigan 1921, Platz 1922, Daniélopolu 1924). From this it follows that the dose-response curve should have a biphasic form. Using ourselves as experimental subjects we obtained such curves, in the following way.

Experiment One

An intravenous infusion of physiological saline solution was set up, and the subject lay at rest until his pulse-rate counted at the wrist, was steady. This usually took the best part of an hour. The pulse was then counted continuously, and the number of beats in each thirty seconds recorded during a ten-minute period before injection of the atropine, and after this until the maximum effect had been reached. The atropine was introduced into the drip tubing as near as possible to the needle, the tubing being clamped during the administration and the drip allowed to run freely immediately afterwards. The subject was unaware of the moment of injection. Furthermore we demonstrated that an injection into the tubing of a volume of saline solution similar to that used for diluting the atropine had no effect on the pulse-rate.

The experiment was repeated thirteen times on subject H. M. using the standard preparation of atropine sulphate *B.P.* in doses from gr. $^1/_{1000}$ to gr. $^1/_{50}$ (0·06–1·28 mg.). Subject E. T. received nine doses within the same range. The control rate was taken to be the mean of the rates for the three-minute period immediately preceding the injection; the effect rate as the mean for a similar period when the pulse was steady at its new rate. Fig. 1 shows the dose-response curve for subject H. M.; that for E. T. was similar, though shifted somewhat to the left, and showing less slowing and more quickening.

Experiment Two

The resting subject (H. M.) was given atropine gr. $^1/_{100}$ (0·6 mg.) subcutaneously. Half an hour later the pulse-rate had fallen by 16%. Under these circumstances the intravenous injection of a "slowing dose" of atropine, gr. $^1/_{250}$ (0·25 mg.), caused an immediate quickening, as might be expected from the results of experiment one, the rate in fact returning to its control value.

RATE OF INJECTION

It is generally agreed that subcutaneous injection of a dose greater than 0·6 mg. causes quickening preceded by slowing (Sturgis et al. 1919, Platz 1922, Shearer 1951). The effect at any one moment during these events is presumably due to that fraction of the total dose present in the circulation at that moment. From this it follows that tachycardia preceded by slowing can be expected if a large ("quickening") dose is given intravenously

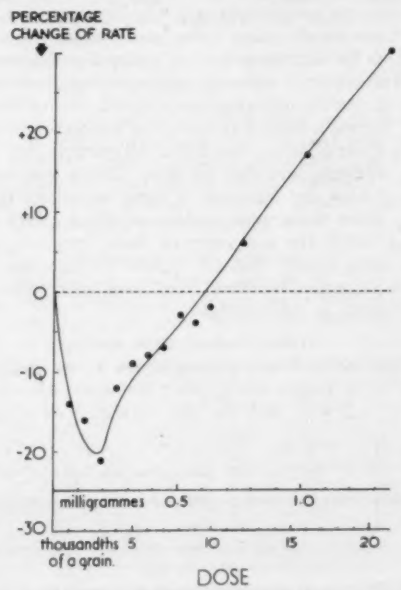

Fig. 1—Dose-response curve (pulse-rate) for intravenous atropine: subject H. M.

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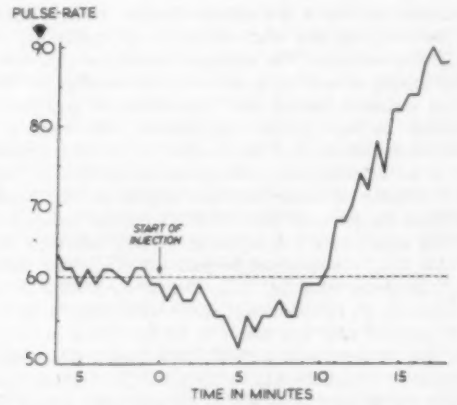

Fig. 2—Pulse-rate changes following intravenous atropine gr. $^1/_{60}$ (1·28 mg.) given during eighteen minutes: subject E. T.

slowly enough. Since the possibility of such a biphasic response has considerable importance in anæsthesia, where the drug is so commonly used in conjunction with neostigmine, it seemed to us worth while to record the results of intravenous injections given at different speeds.

Experiment Three

The subject was prepared as before, and atropine gr. $^1/_{60}$ (1·28 mg.) was injected intravenously during eighteen minutes. The result, shown in fig. 2, follows expectation.

It was interesting now to conjecture how the curve would change as the rate of injection was increased. Would the amount of slowing stay the same but its duration get shorter, or would both the amount and duration of slowing decrease? We injected gr. $^1/_{60}$ (1·28 mg.) during ten, five, and two and a half minutes, and found that the amount and duration of slowing were decreased. At the fastest rate (two and a half minutes) there was no initial slowing at all. However, we thought that there might have been some slight slowing too transient for detection by the method so far used. We therefore repeated the experiment, using a continuously running electrocardiograph as the indicator of the pulse-rate. The same dose of atropine was injected intravenously during three minutes, two and a half minutes, one minute, thirty seconds, and five seconds. There was no initial slowing with the last two of these rates. At the three slower rates there were periods of about thirty seconds during which the R–R intervals were irregular, some of them being longer than any before the injection (fig. 3). On no occasion, however, could any other abnormality be detected in the tracings.

TIME TO MAXIMUM EFFECT

When we used accelerating doses in our experiments, tachycardia began about thirty seconds after the intravenous injection, and the rate increased to a maximum within two or three minutes, almost the whole of this increase taking place during the first ninety seconds. We have observed the same response in hundreds of premedicated, anæsthetised patients who were given intravenous atropine at the end of operation. In contrast to this, in our own experiments the time taken for a slowing dose to produce its greatest effect was of the order of five to eight minutes.

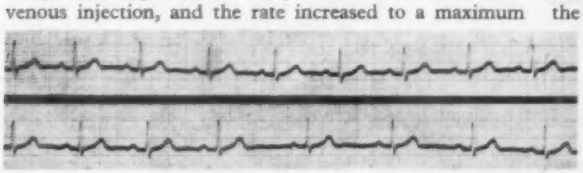

Fig. 3—Effect on the electrocardiogram of atropine gr. $^1/_{60}$ (1·28 mg.) injected intravenously during one minute: subject H. M. Upper tracing—control period. Lower tracing—forty seconds after start of injection.

Discussion

All the foregoing observations support the view that the effect of atropine on the heart-rate is a function of three things: the total dose, the route of administration, and, if the intravenous route is used, the rate of administration. The conflicting statements in the literature can be reconciled if these factors are taken into account.

Bain and Broadbent (1949) said that an intravenous injection would cause tachycardia preceded by slowing, but based this opinion on their experience with subcutaneous injections. Their prediction is true for slow intravenous injections, but not for quick ones. Orkin et al. (1956) found in twelve volunteers that intravenous doses of 0·4 and 0·6 mg. per 70 kg. body-weight were followed by tachycardia, though, "during the actual injection there was slight but persistent slowing". A close study of their data reveals that they took eight minutes to give the drug, and the slowing to which they draw attention is thus explained. Smith et al. (1928) found that 1·2 mg. intravenously caused initial slowing. They did not record their rate of administration; but, since they say the slowing was "during the actual injection", the atropine cannot have been given very quickly. Again, Nalefski and Brown (1950) noted an initial slowing but did not state the rate of injection. Their maximum rate came after six to ten minutes, and this implies to us that the atropine was given slowly.

Platz (1922), Freeman and Carmichael (1936), Shearer (1951), and Hunter (1953) could not demonstrate initial slowing after intravenous injection. These workers explicitly state that their injections were given rapidly.

According to the workers quoted, the usual therapeutic dose (gr. $^1/_{100}$, 0·6 mg.) is only just within the accelerating range; and not only do individuals vary in their response but also, in clinical practice, it is not usual to calculate the dosage for adults according to body-weight. Hence gr. $^1/_{100}$ (0·6 mg.) intravenously could be expected slightly to slow the pulse of some subjects, as Rollason (1957) found, and as was the case with H. M. in our experiments. This dose would, however, more consistently cause tachycardia if the subjects were already under the influence of a small amount of the drug (see experiment two). It is not surprising then that Pooler (1957) reported that a therapeutic dose given intravenously "practically always" accelerated the pulse, since his results were obtained in anæsthetised patients, who would have been premedicated with atropine or scopolamine.

As to the time taken to reach maximum tachycardia after an intravenous injection, we agree with Hunter (1953) that this is of the order of two or three minutes. Freeman and Carmichael (1936) and Shearer (1951) give the time as about five minutes, but, as these workers did not count the pulse continuously, the maximum in their cases could have occurred earlier. It is common anæsthetic practice nowadays to wait several minutes for the greatest effect—Doughty and Wylie (1952) and Lee (1957) suggest as long as fifteen to twenty minutes. This doubtless follows the recommendations of Bain and Broadbent (1949), although, as Pooler (1957) has pointed out, these workers explicitly state that they based their opinion on

the results of subcutaneous injections, for which a time to maximum of at least twenty minutes could be expected.

These observations have an important bearing on the use of atropine in conjunction with neostigmine, and we hope to describe later the results of further relevant experiments.

Conclusion and Summary

It has long been known that atropine can slow the pulse-rate, quicken the pulse-rate or produce quickening preceded by slowing. Published reports, however, still contain conflicting findings and recommendations, particularly where the use of the drug in anæsthetic practice is concerned and where the time to maximum effect is important. These contradictions can be reconciled if the effect is taken to be a function of the total dose, the route of administration, and, in the case of intravenous administration, the rate of administration.

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Medical Societies

HEBERDEN SOCIETY

Hypersensitivity and Rheumatoid Arthritis

ON Dec. 5 Dr. CHARLES RAGAN (Columbia University, New York) gave the 1958 Heberden oration. He spoke on the role of hypersensitivity in the pathogenesis of rheumatoid arthritis.

Four main theories had been advanced to explain rheumatoid arthritis: infection and focal sepsis, metabolic abnormality, endocrnie abnormality, and hypersensitivity. Dr. Ragan's working hypothesis was that rheumatoid arthritis was primarily a vasculitis. In this context the theory of hypersensitivity was attractive and the existence of the rheumatoid factor, a gamma-globulin (" an antibody to an antibody when the latter exists as an antigen-antibody complex "), made the theory more tenable; but there were difficulties. In no animal could induced hypersensitivity lead to *sustained* arthritis and vasculitis. Vasculitis did not necessarily imply hypersensitivity, since rickettsiæ and viruses could produce a widespread change of this type. All connective-tissue constituents so far tried had failed to produce anything resembling rheumatoid arthritis when injected into animals, even when adjuvants were used.

Transfusion of the rheumatoid factor in volunteers did not produce disease, and patients with agammaglobulinæmia could get something that looked like rheumatoid arthritis. If the rheumatoid factor were an antibody it was species non-specific; but so were the thyroid antibodies lately described in connection with thyroiditis. One of the biggest difficulties was the proportion of about 5% of the normal population of temperate countries that showed a positive test for the rheumatoid factor but which did not have rheumatoid arthritis; and there were also many patients with rheumatoid arthritis in whom the rheumatoid factor was absent. In a recent incomplete survey of the native population of Liberia by Columbia University, no example of rheumatoid arthritis was found. Nevertheless 15% showed a positive reaction for the rheumatoid factor as measured by the F II tanned-sheep-cell agglutination reaction. In contrast the frequency of rheumatoid arthritis in the Negro populations in the United States was similar to that in the white population. Nevertheless, until the possible pathogenic role of the rheumatoid factor was thoroughly and completely disproved, it provided the only support for the implication of hypersensitivity in the pathogenesis of rheumatoid arthritis. If its role were disproved we faced a long, hard struggle which could be won in the foreseeable future only with great luck and a dash of serendipity.

Short accounts of some other contributions to the society's meeting are recorded below.

Metabolic Bone Disease

Dr. S. W. STANBURY, Dr. A. J. POPERT, and Dr. J. BALL (Manchester) called attention to the simulation of rheumatic disorders by metabolic bone disease, particularly osteomalacia. Proof of osteomalacia had been the demonstration of wide seams of unmineralised osteoid, best revealed by von Kossa staining of biopsy specimens of undecalcified bone. Osteomalacia was a treatable condition. Untreated it was painful and disabling and might lead to serious deformity; yet cases of osteomalacia were often misdiagnosed for years as muscular rheumatism, osteoarthritis, or even hysteria. Symptoms could be very variable: for example, spontaneous rib fractures might simulate pleurisy. A history of rickets or of osteotomies in childhood was sometimes helpful; there may be a curious discrepancy between symptoms caused by weightbearing and non-weightbearing limb movement. Radiologically the bones were not necessarily porotic; sometimes they appeared abnormally dense. A combination of dense bones and bowing had given rise to the misdiagnosis of Paget's disease. On other occasions, however, secondary bone proliferation around joints, or ossification of the spinal ligaments, had been mistaken for arthritis or ankylosing spondylitis. Cases were cited of adult osteomalacia complicating renal disease, the Fanconi syndrome, and intestinal malabsorption, including that which follows gastrectomy.

Prof. E. G. L. BYWATERS (Taplow) called attention to the joint changes seen in hyperparathyroidism, with erosions and collapse of subchondral bone and secondary degenerative changes. Some of these changes resembled those recently described in biliary cirrhosis, Gaucher's disease, and other diseases with weakening or infiltration of bone.

Salicylates and Anæmia

Dr. I. PORTER, Dr. M. LEWIS, and Dr. A. ST.J. DIXON (Hammersmith) described an investigation of fæcal blood-loss following aspirin therapy, using radioactive chromium-tagged red cells. 11 inpatients, without anæmia (10 with rheumatoid arthritis and 1 with degenerative joint disease) were given gr. 60 of aspirin daily. All patients lost blood whilst taking aspirin or calcium aspirin (there was no difference between these two preparations), but enteric-coated sodium salicylate in the same dosage did not cause bleeding. The amounts lost were small, usually less than 4 ml. per day, which was unlikely, in the absence of other factors, to cause iron-deficiency anæmia. Aspirin therapy did not seem to be contraindicated by this finding, but there was much variation between patients, and 3 patients who had presented with iron-deficiency anæmia were found to lose up to 20 ml. or more of blood daily. These patients had all been taking aspirin for long periods and their fæcal blood-loss stopped when this drug was withdrawn.

Dr. J. J. R. DUTHIE (Edinburgh) reviewed the records of 47 patients on continuous salicylate medication since 1945. Their average haemoglobin was 79% initially and 87% when last seen. 30 of the patients had had some iron preparation. He too felt that fæcal blood-loss caused by salicylates was not a serious objection to their use.

Rose-Waaler Test in Still's Disease

Professor BYWATERS, Dr. MARY CARTER, and Dr. F. T. SCOTT (Taplow) had studied the Rose-Waaler test (D.A.T.) in 142 children with Still's disease, who were under 16 years of age at the onset of the illness. The patients had been followed between 4 and 10 years and the D.A.T. had been estimated an average of 9·5 times per patient. 13·4% were seropositive at the first test and 45% had shown at least one positive test. 19·7% had had two or more positives. Positives were commoner in the older age-groups and in males. There was no very close correlation between seropositivity and disease activity even in those with a number of positive results, and the only clinical feature which correlated with the positive results was the presence of nodules.

Disappearance of Intradermal Congo-red

Dr. R. A. PARKINS (Hammersmith) and Professor BYWATERS had studied the disappearance of intradermally injected congo-red dye in adults with rheumatoid arthritis, in normal healthy adults, and in hospital inpatients with miscellaneous diseases. Abnormally slow fading-rates were seen in 28 subjects of whom only 6 suffered from rheumatoid arthritis; and of these 6, 1 had suspected and 3 proven secondary amyloidosis. 2 patients with amyloidosis secondary to other disease also had slow fading-rates. 8 patients with lupus erythematosus, 7 of whom had systemic disease, showed delayed fading from apparently healthy skin. 10 jaundiced patients had slow fading-rates; 7 of them had obstructive jaundice. No common factor could explain this apparent dermal avidity for dye in the three groups of patients, but all had abnormal serum-proteins and perhaps abnormal tissue-proteins.

Evaluation of Anti-inflammatory Compounds

Dr. J. P. CURRIE (Glasgow) described experiments with salicylates, pirazol derivatives, and substances with anti-histamine action. The tests used included the suppression of tissue reaction to injected egg-albumin and kaolin or to ultra-violet-light injury, as well as tests of antipyretic, analgesic, antihistaminic, and water-retaining activities. There was a great deal of species variability, and the anti-inflammatory effectiveness of a compound varied with the type of test used. Experimental results bore little relationship to human therapeutic values; nevertheless in this work, though largely negative, some incidental findings had proved of value—for example, pirazol derivatives had been found which were uricosuric though not analgesic.

Reviews of Books

Autonomic Imbalance and the Hypothalamus

ERNST GELLHORN, M.D., PH.D., professor of neurophysiology, University of Minnesota. Minneapolis. Minnesota: University of Minnesota Press. London: Oxford University Press. 1958. Pp. 300. 68s.

THERE is an old and proved saying, that circumstances alter cases. Dr. Gellhorn has attempted a scientific study of the circumstances which alter responsiveness to the central nervous system. He has in particular studied induced changes in intensity of activity of sympathetic and parasympathetic centres in the hypothalamus. Using contractions of the nictitating membrane as indicator, he found, for instance, that there was an increase in sympathetic activity in hypotension variously induced, compared with activity when blood-pressure was normal. Certain tests suggested that the hypothalamus was in particular responsible for this change in level of autonomic activity. A similar alteration in parasympathetic "tuning" could be demonstrated. The state of the hypothalamic centres could be altered by proprioceptive stimuli, by sympatho- or parasympatho-mimetic drugs, and by cerebral cortical processes. Vice versa, changes in the hypothalamic activity and autonomic balance profoundly affected the cerebral cortex as well as peripheral responses. From the results of one of his hypotension-inducing tests he concluded that sympathetic reactivity declined considerably with increasing age. He also found significant differences in given age-groups, between the sympathetic reactivity of normal persons and those suffering from psychiatric disorders; he classed psychopaths especially among the hyperreactors, whereas schizophrenics seldom showed hyperreactivity.

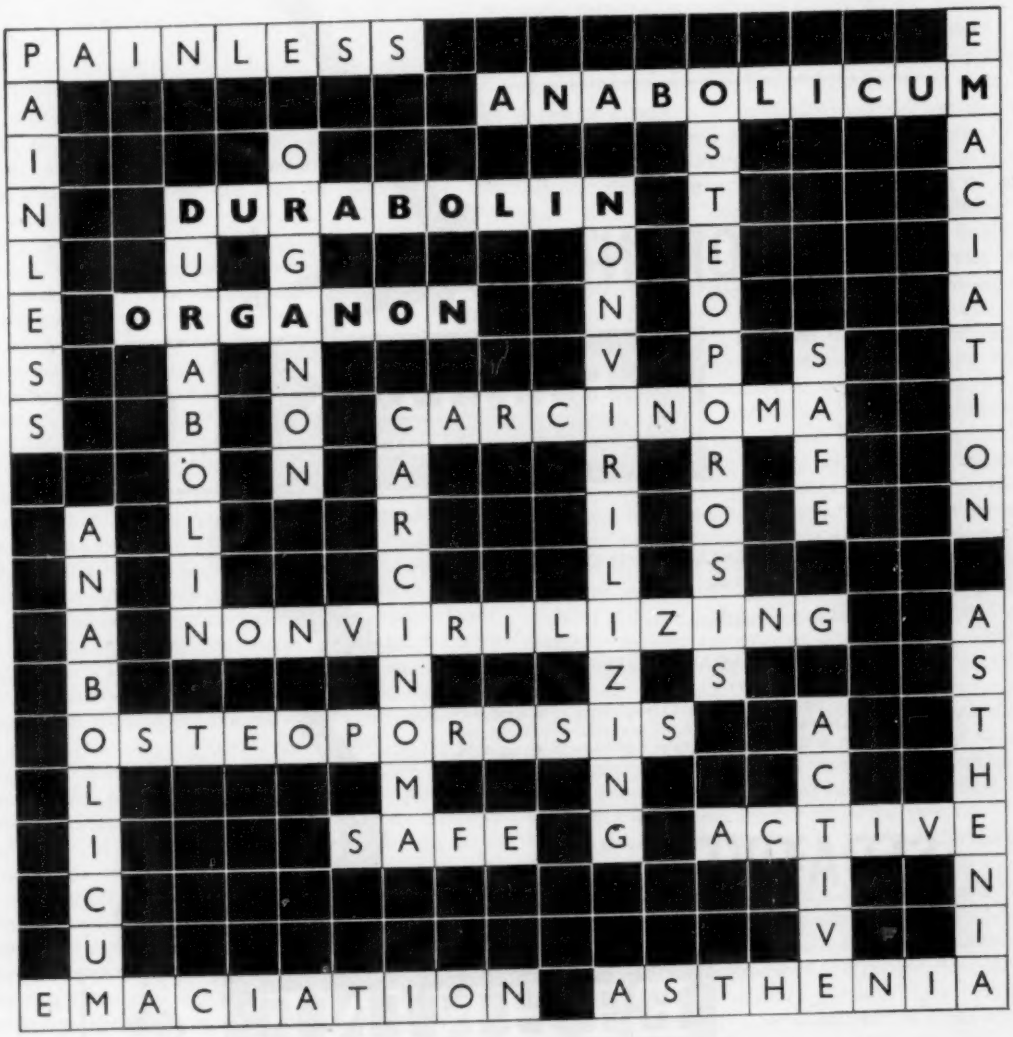
The problem attacked by Dr. Gellhorn is both important and difficult, and he has made a number of suggestions which may profitably stimulate others. All the more pity, then, that the book is largely a general account of work which has, so far, not been published in detail. Proper assessment of some of the conclusions is therefore impossible. Little information is given as to the exact location in the central nervous system of recording and stimulating electrodes, and it is not sufficiently helpful to be told they were in the right hypothalamus or the visual cortex. Nor are the tables and figures relating to the reactivity of different age-groups and mental states very enlightening. Conclusions rather than detailed information are supplied, and these results are important enough to warrant fuller description. It is a pity that such potentially interesting work should be marred by these and other inadequacies. Nevertheless, the interesting idea behind the work is that autonomic changes reflect or are related to cerebral states which can be recognised as normal or psychotic, and that the autonomic changes are measurable; and for this idea in itself the book deserves attention.

Hospital Planning for the Anesthesiologist

WILLIAM H. L. DORNETTE, M.D., professor of anesthesiology and head of the department, University of Tennessee College of Medicine. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1958. Pp. 119. 40s.

THE limited scope suggested by the title is belied by a list of contents that ranges from the selection of an architect, through diagnostic radiology, to planning for local disaster. Practically every aspect of hospital design, construction, and function is mentioned, but in a general rather than a detailed way. Anæsthetists will find, among others, useful chapters on the recovery room, the "intensive care facility", conductive flooring, and illumination; but they will be surprised to read that the author does not consider, in view of the high cost of hospital building in the United States, that an induction (anæsthetic) room is a necessity. This brief and easily read survey will help the unwary and unschooled to avoid the major pitfalls so often associated with amateur hospital planning.

Lumbar Disc Lesions (2nd ed. Edinburgh: E. & S. Livingstone. 1958. Pp. 244. 45s.).—The general form of Mr. J. R. Armstrong's book, which first appeared six years ago, is unchanged, but the chapters on the pathology and ætiology of disc degeneration have been rewritten to consider recent work. There are some changes too in the sections on methods of treatment, and Mr. Armstrong notes that manipulation is less often advocated than it was: its place has been largely taken by traction ("another of the more irrational manifestations of therapeutic exuberance"). It is, of course, no fault of the author that the greatest shortcoming of the book is that nowhere in it is yet to be found a rapid and effective cure, even for a minority of lumbar disc protrusions. His monograph remains the most authoritative and comprehensive guide yet written to existing methods of treatment, operative and conservative.



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Genetic Hazards of Diagnostic Radiology

IT is now six years since the suggestion [1] was made that diagnostic radiology was being used so widely as to be an appreciable genetic hazard to exposed communities, even though the dose of radiation to the gonads of each patient was small. The assessment made at that time considerably underestimated this hazard, because of an error in the assumed frequency of examination. The suggestion, however, stimulated much useful work (that of STANFORD and VANCE [2] is outstanding), particularly in evaluating the average gonad doses received during certain types of examination with specified techniques. These data formed the basis of the estimate [3] in the Medical Research Council report [4] of 1956 that this possible source of mutations added in this country at least 22% to the "genetically significant dose" of radiation from natural sources. A similar estimate for the United States [5] made at the same time suggested an increase of about 100% over natural background. The United Nations Scientific Committee on the effects of atomic radiation, set up in 1955, called for data from as many places as possible; and work was at once started in several countries to assess the hazard from diagnostic radiology. The broad picture was outlined in the committee's report [6]: the genetically significant doses from medical procedures were of the same order as doses from natural sources, and 80–90% of the total diagnostic dose to the gonads came from a few types of examination of the abdomen and pelvis. But much detail remained to be filled in, and the observations of LARSSON [7] in Sweden, now published, do much to amplify the record.

Though very few measurements of X-ray doses to the testes were reported until recently, such doses are not difficult to measure directly. Ovary doses, on the other hand, cannot be measured directly, and some way of deriving them must be found. STANFORD and VANCE measured the dose on the anterior surface of the abdomen and used conversion factors obtained from experiments on cadavers. In Scandinavia, however, both LARSSON and HAMMER-JACOBSEN [8] preferred ionisation chambers inserted in the rectum at the level of the ovary (except in barium-enema examinations, when they put them in the posterior fornix). In general, the doses they found were higher than those recorded in earlier inquiries, and much higher in barium-enema, abdomen, and chest examinations. Though this method may give a better assessment of ovary dose, differences in technique will influence the results. The Swedish work also includes a series of measurements on children of different ages, augmenting the findings of BILLINGS et al.[9] in the United States.

To assess the genetically significant dose in diagnostic radiology, we need to know the number of different types of examination performed, and the age and sex distribution of those examined. LARSSON gives fuller information on these points than has appeared in earlier reports, although most of the data came from no more than five X-ray departments, one specialising in pædiatric radiology. OSBORN and SMITH's findings [3] were also based on five hospitals, and this may well have been an inadequate sample which biased the results. LARSSON's final calculations are that the genetically significant radiation in Sweden amounts to 72 millirontgen (mr) per person per annum, about three times the minimum estimate of OSBORN and SMITH for England and Wales. LARSSON points out, however, that this figure could be reduced to 28 mr by careful technique with little loss of diagnostic information. The possible changes in technique include protection for the scrotum, restriction of special views in obstetric and pædiatric examinations, and reorganisation of urethrography. Other means of reducing exposure have been suggested. TROUT et al.[10] recommended the use of high kV and filters; but though this certainly reduces the skin dose, it may not similarly reduce doses in deeper tissues or restrict scattered radiation.[11] ARDRAN,[12] CLARKE,[13] and others have emphasised the advantages of restricting the beam size to the minimum, thereby not only reducing the volume of the patient irradiated, and sometimes excluding the gonads from the beam, but also cutting down the scatter to parts of the patient remote from the primary beam. One device recently introduced [14] for the protection of the gonads is the material known as 'Armadillo'.

A survey similar to LARSSON's, but a much wider one, is being undertaken in this country under the direction of the Adrian Committee,[15] and the outcome is likely to be a more accurate assessment of the genetic dose than is possible in almost any other country, since here over 95% of the dose is delivered in hospitals or other institutions of the National Health Service. We hope that, when this enormous survey is complete, it will be possible to make the report as detailed as LARSSON's.

It is questionable of course to what extent such quantities of radiation are harmful, even genetically. Increase of the gonad dose to 20% (or even 100%) above natural background may mean only a very small increase in genetic damage, which may take centuries to detect. Recent work [16] suggests that in mice the genetic effect

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of a given dose of radiation may depend on the rate at which it is given. This finding, if it is substantiated, shakes to the core the commonly accepted genetic hypothesis that the number of radiation-induced mutations is dependent solely on the total dose delivered. An alternative explanation is that a given dose of radiation produces more mutations in a testis than in an ovary—a thesis which is just as shattering to accepted ideas. Thus, even if the radiation doses were known with certainty, it would be premature to say just what are the genetic effects of present-day diagnostic radiology. A further point arises here. If the number of radiation-induced mutations depends on dose-rate, it follows that diagnostic examinations, where the dose-rate is high, would have a disproportionate genetic effect, compared with background radiation at low dose-rate. If, on the other hand, the same dose induces more mutations in the male than in the female, any genetic effect of diagnostic radiology can be greatly reduced simply by using appropriate testicular shields. It is certainly wise, however, in our present ignorance, to reduce all gonad doses to the very minimum.

Clinical Significance of Serum-transaminase Levels

GLUTAMIC oxaloacetic transaminase (G.O.T.) and glutamic pyruvic transaminase (G.P.T.) each remove an amino group from glutamic acid. This group is then transferred to oxaloacetic (G.O.T.) or pyruvic (G.P.T.) acid with the formation of aspartic acid and alanine respectively. Both enzymes are widely distributed in human tissues.[1] The G.O.T. content is greatest in heart, is high in liver, and is somewhat less in muscle and kidney. The G.P.T. content is greatest in liver and much less in kidney and heart. In comparison with levels in the tissues, the normal serum levels of both enzymes are very low. By means of colorimetric techniques, normal serum levels have been defined in terms of units; the serum-glutamic-oxaloacetic-transaminase (S.G.O.T.) range being 4–40 units and the serum-glutamic-pyruvic-transaminase (S.G.P.T.) range 1–45 units. The normal individual range of variation is not more than 10 units.

LA DUE et al.[2] first showed that a significant increase in S.G.O.T. follows myocardial infarction in man. The rise is manifested about six to twelve hours after the coronary occlusion[3]; the level reaches a peak, which may be as high as 15 times the normal level, within twenty-four to forty-eight hours and returns to normal by the fourth to seventh day. If determination of the serum-enzyme level is delayed too long, the result may be negative. BARON et al.[4] obtained constantly high levels, provided the specimens were obtained twelve to forty-eight hours after the infarction; but other workers have obtained false negative results[5] in a small proportion of cases—in the series investigated by Dr. KEELE and his colleagues[6] the false negatives were under 2%. Possibly with relatively small infarcts the peak level is only at the top limit of the accepted normal range.[5] In a patient whose serum-transaminase in health is in the low range of normal, a level of 40 units might represent a genuine rise; it is, therefore, advisable in such a case to carry out serial determinations. If the value falls by more than 10 units (the accepted normal range of individual variation) this could be regarded as possible supportive evidence for the diagnosis of cardiac infarction.

As DEWAR et al.[5] have pointed out, the S.G.O.T. level has proved of especial value in complicated coronary infarction. An extension or a second infarction will give a secondary peak, even though the electrocardiogram has not changed. Diagnosis is also difficult when an abnormal electrocardiographic rhythm is associated with cardiac infarction, and a rise in S.G.O.T. is then a valuable pointer. KEELE et al.[6] have shown that the height of the S.G.O.T. level twenty-four to forty-eight hours after the onset of pain is closely related to immediate mortality and the development of heart-failure. The prognostic importance of the height of the peak has been demonstrated also by others; the height is to some extent correlated with the size of the infarct estimated by electrocardiography.[5] Dr. GOBLE and Dr. O'BRIEN[7] have found that the S.G.O.T. level is a sensitive index of myocardial necrosis. Anginal pain at rest, with an abnormal but not diagnostic electrocardiogram but with a raised S.G.O.T. level, carries the same prognostic significance as does the electrocardiographically proven infarction.[6] On the other hand, a normal serum-transaminase level does not exclude a small coronary infarction, particularly if this is sub-endocardial. With chest pain from most other causes, the serum-transaminase does not tend to be raised; but BARON et al.[4] found increased values after pulmonary embolism accompanied by protracted shock. A rise has also been observed as a result of rupture of the left pectoralis major muscle.[6]

Much useful diagnostic information has been obtained from study of the serum-transaminases in hepatic disorders. The highest levels, involving increases in both S.G.O.T. and S.G.P.T., have been found in toxic hepatic disease. In carbon-tetrachloride poisoning, peak levels of both serum enzymes as high as 27,000 units have been recorded. These values fall rapidly towards normal after exposure to the toxin is ended.[8] In viral hepatitis[9,10] both transaminases are increased; but the increase in S.G.P.T. is thought by some to exceed that of S.G.O.T. The rise occurs in the prodromal phase; and the peak, which may be 100 times the normal level, is reached at a time when the patient is clinically at his worst. With clinical evidence of improvement the levels fall.[11] With complications there is often a secondary superimposed rise; and such a rise is sometimes associated

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2. La Due, J. S., Wróblewski, F., Karmen, A. *Science*, 1954, **120**, 497.
3. La Due, J. S., Wróblewski, F. *Circulation*, 1955, **11**, 871.
4. Baron, D. N., Alexander, C. P., Bell, J. L., Oakley, C. M. *Quart. J. Med.* 1958, **27**, 533.
5. Dewar, H. A., Rowell, N. R., Smith, A. J. *Brit. med. J.* Nov. 8, 1958, p. 1121.
6. Keele, K. D., Goulden, F., Newman, M. J. D. *Lancet*, Dec. 6, 1958, p. 1187.
7. Goble, A. J., O'Brien, E. N. *ibid.*, Oct. 25, 1958, p. 873.
8. Wróblewski, F., La Due, J. S. *Ann. intern. Med.* 1955, **43**, 345.
9. De Ritis, F., Coltorti, M., Giusti, G. *Minerva med.* 1955, **46**, 1207.
10. Pryse-Davies, J., Wilkinson, J. H. *Lancet*, 1958, i, 1249.
11. Wroblewski, F. Hepatitis Frontiers (edited by F. W. Hartman and G. A. Logrippo); p. 447. Boston, Mass, 1957.

with over-early ambulation—a rise of 50 or more units is sometimes taken as indicating a need for return to the regime of rest. Relapses of hepatitis are associated with secondary rises, and unresolving hepatitis tends to be accompanied by persistently increased serum-transaminase at a time when serial estimates would be expected to be showing a return to normal.[12] The failure of S.G.O.T and S.G.P.T. to return to normal suggests the development of chronic hepatitis. It seems that in hepatitis serial readings may provide a more accurate indication of the clinical state than the conventional liver-function tests.[13] In an epidemic of acute infective hepatitis in an institution, the serum-transaminase levels proved more sensitive indicators of subclinical hepatitis than the conventional tests.[14] Other virus diseases, if complicated by hepatitis, also bring about raised serum levels.

Hepatic cirrhosis is associated with an increase in S.G.O.T. and a smaller increase or no increase in S.G.P.T[12] Biliary cirrhosis is generally accompanied by somewhat greater increases than portal cirrhosis.[15] If cirrhosis becomes complicated by superimposed hepatitis, there is an additional rise in the serum level of these enzymes.[8] This further rise is not found in decompensated cirrhosis, and so the test is useful in deciding whether sudden hepatic decompensation is due to progressive cirrhosis or to superimposed hepatitis.

In neoplastic disease involving the liver the S.G.O.T. level rises somewhat, the extent being roughly proportional to the amount of liver-cell injury resulting from tumour growth.[16] In this respect the transaminase level behaves like that of alkaline phosphatase; but there is not (as there is with alkaline phosphatase) a rise resulting from bone involvement.

Estimation of serum-transaminase is proving to be particularly useful in the differential diagnosis of jaundice. The levels tend to be higher in jaundice resulting from hepatocellular disease than in that resulting from extrahepatic obstruction. This is the reverse to the behaviour of serum-alkaline-phosphatase, and LATNER and SMITH [17] have shown that the S.G.O.T/serum-alkaline-phosphatase ratio can be of considerable help in diagnosis. KOVE et al.[18] have found that the serum-transaminase level may be useful in the differential diagnosis of jaundice in the newborn infant. In the neonate the normal range of serum-transaminase is much greater than in adults, S.G.O.T. ranging from 13 to 120 units and S.G.P.T. from 12 to 90 units. In infants with physiological neonatal jaundice and jaundice secondary to hæmolytic conditions, the serum-transaminase level seems to remain in the normal range; but in one case of very severe hæmolysis there was some rise. With agenesis of the common bileduct, the serum level rises gradually over some weeks to levels below 800 units. In one infant with mild acute hepatitis the level rose, in one week, to well above 800 units. This corresponded to the time of increasing jaundice and was followed by a rapid return to normal neonatal values in about a week. It seems very likely that the different types of neonatal jaundice may prove to be associated with characteristic patterns of serum-enzyme activity.

Increases in S.G.O.T. have been observed in massive cerebral hæmorrhage and thrombosis.[19] S.G.O.T. levels of cerebrospinal fluid have also been studied; but there is some doubt about the clinical usefulness of transaminase determinations in relation to disease of the central nervous system.

12. Wróblewski, F., La Due, J. S. *Ann. intern. Med.* 1956, **45**, 801.
13. See *Lancet*, Aug. 23, 1958, p. 403.
14. Wróblewski, F., Jervis, G., La Due, J. S. *Ann. intern. Med.* 1956, **45**, 782.
15. Molander, D. W., Sheppard, E., Payne, M. A. *J. Amer. med. Ass.* 1957, **163**, 1461.
16. Wróblewski, F., La Due, J. S. *Cancer*, 1955, **8**, 1155.
17. Latner, A. L., Smith, A. J. *Lancet*, Nov. 1, 1958, p. 915.
18. Kove, S., Goldstein, S., Wróblewski, F. *J. Amer. med. Ass.* 1958, **168**, 860.

Annotations

HOSPITAL COSTING RETURNS

THIS year, for the first time, details based on data from 200 large hospitals in England and Wales have been published on the cost of a number of departments, among which are inpatient wards, outpatient departments including casualty, general administration, medical records, maintenance, boiler-house, power and lighting, laundry, catering, radiography, pathology, and physiology.[20] These figures give some picture of the proportional costs of different sections of the hospitals. Hitherto, costs of inpatients have been assessed by removing the cost of outpatients on an arbitrary basis of 5 outpatients equalling 1 inpatient day—a device that underestimated the cost of inpatients.

The comparison of figures between different hospitals does not seem to be particularly rewarding. Here and there are striking differences; but a high cost for outpatients is correlated with a small department, and the greater the number the smaller the cost. The figures for catering are surprisingly similar. The cost of power, lighting, and heating, and maintenance fluctuates considerably, but this is only to be expected with the great physical differences between hospitals. In some minds there is doubt about the accuracy of the basic data. There may be alternative ways of calculating a cost, and a brief inquiry shows that there has been no uniformity. The cost of power, lighting, and heating is related to cubic capacity. How many hospitals have given an approximate figure based on guesswork, and how many have had an accurate survey made? Such a survey is an expensive undertaking. Where has its cost been allocated?

The object of these departmental costings is to enable hospitals to achieve further economies in management and greater efficiency. The idea is excellent, but possibly the savings will not be commensurate with the cost of the costings; the results of the first year's report should be carefully studied, and detailed costing perhaps continued on a limited scale taking one department at a time. Everyone knows how economies could be made; but most require capital expenditure, which is still restricted: with high maintenance costs due to capital starvation, our hospitals are among the least efficient organisations in the country. One puzzling feature of the costing is the introduction of depreciation as a book item for some departments. In the X-ray department, ten-year deprecia-

19. Lieberman, J., Lasky, I. I., Dulkin, S. I., Lobstein, O. E. *Ann. intern. Med.* 1957, **46**, 497.
20. National Health Service: Hospital Costing Returns Year Ended March 31, 1958. Vol. 1: hospitals which operated the main scheme. H.M. Stationery Office. £1 12*s.* 6*d.*

tion is calculated on all equipment costing £750 or more. With the inability of hospitals to accumulate capital, and the absence even of any contingency fund, the marking down of depreciation seems pointless and misleading. Hospitals do not want this sort of financial juggling but real practical help.

Is it really necessary for a patient's name to be rewritten perhaps a dozen times on admission and many times subsequently? Industry would use a punch stamp. Is it really necessary to have such inefficient interdepartmental communications and so much running backwards and forwards by nursing staff? Is it really necessary for skilled painters to wash down paint? Are there no recent advances in decoration techniques to reduce the heavy cost of maintenance? Must heat from power-stations be dissipated into the air when it could heat a nearby hospital? And why keep hospitals in expensive sites when they could be rebuilt more conveniently for the cost of the land? Why cannot the Treasury and the Ministry of Health really settle down to the problem of building first-class hospitals with lower running costs—instead of being content with extravagant second-class buildings which are inferior to those in nearly every other Western country?

EXERCISE AND THE BLOOD-SUPPLY OF THE SPINAL CORD

In the majority of tissues increased metabolic activity is accompanied by increased blood-flow and local vasodilatation, and this has been shown in the brain in laboratory animals.[1] Up till recently there has been little evidence as to whether the same holds in the spinal cord. Blau and Rushworth [2] have now investigated this question.

By an ingenious technique they have produced repetitive spinal flexor reflexes at two-second intervals for periods of half an hour up to two hours in one lower limb of lightly anæsthetised mice. They were able to avoid crossed extensor and other associated reflexes by applying a minimal stimulus. Immediately the stimulation was stopped the heart was opened and the left ventricle perfused at first with saline solution and then with diluted indian-ink, and the animal was fixed in formol saline. Sections of the spinal cord were then examined, the two sides of the cord being compared, and comparison was also made with control animals which had been treated in a similar way except for the absence of electrical stimulation. The sections of the cord were examined for increased vascularisation and for blood-vessel dilatation, and reasonably clear-cut results were obtained. In 16 of the 21 animals in which the injection was adequate there was pronounced vascular dilatation and increased density of blood-vessels localised to the homolateral region of the spinal-cord segments activated by the flexor reflex, while in the other 5 animals there was dilatation of blood-vessels in patches of the lumbar and sacral segments with some extension into the thoracic cord. Blau and Rushworth could not demonstrate any simple relationship between the duration of stimulation and the vascular response.

In these experiments the increased activity in the lower spinal segments was caused by reflex action, but, assuming that there is a similar vascular response during voluntary movement, Blau and Rushworth have suggested some clinical correlates of their findings. In 1911 Déjerine [3] described intermittent claudication of the spinal cord in which when the patient walked the legs became heavy and progressively weaker and sphincter disturbance developed, the condition improving when the patient rests. When the symptoms were brought on by exertion there might be mixed upper and lower motor neurone signs in the legs; the signs disappeared with rest. This rare and badly named syndrome has attracted comparatively little attention since Déjerine's description, but Blau and Rushworth's findings help to explain its pathogeny. In the presence of disease of the spinal arteries—and the condition has been found in neurosyphilis and in arteriosclerosis—the blood-supply may be sufficient for the resting needs of the lumbar and sacral segments, but when the patient walks the increased vascular supply needed cannot be delivered through the diseased vessels and progressive anoxia and impaired function develop. Blau and Rushworth also suggest that their findings may be important in explaining the increased incidence of paralysis in anterior poliomyelitis when exercise is taken during the preparalytic stage of the disease.[4] During the early stage there is viræmia,[5] and if muscles are exercised there will be increased local vascularity of the spinal cord and possibly also increased permeability of the blood-vessels. They suggest that their work might be extended to determine whether the increased vascularity is in fact accompanied by increased permeability of the vessels to injected particulate matter and viruses.

1. Serota, H. M., Gerard, R. W. *J. Neurophysiol.* 1938, **1**, 115.
2. Blau, J. N., Rushworth, G. *Brain*, 1958, **81**, 354.
3. Déjerine, J. *Pr. méd.* 1911, **19**, 981.

FOOD AND AGRICULTURE 1958

The latest estimates of agricultural production have been set out by F.A.O.[6] The report indicates that in the relatively underdeveloped regions—the Far East (excluding China), the Near East, Africa, and Latin America—agriculture is just keeping pace with the growth of population. In 1957 the estimated annual increases for these regions were 2·6% and 1·7% respectively. These figures support the view that, in those parts of the world where undernutrition is widespread, conditions in recent years have changed little—either for the better or for the worse. In many of the less developed countries schemes for agricultural improvement have been held up by a lack of funds for capital investment, largely because of declining earnings from exports. Nevertheless vigorous efforts are being made to keep pace with the requirements of growing populations, and in some countries notable developments have taken place.

In Western Europe the annual increase in population was only 0·8% and in agricultural production 1·3%. Thus, we are becoming a little less dependent on outside sources for our food.

North America and Oceania are two regions with a high rate of population increase (1·9 and 2·4% annually) but with large agricultural surpluses. In both there has been great expansion in agriculture, but last year this was checked; and in neither region is agriculture now increasing so fast as the population. This slowing down in the development of resources is a new feature in economic affairs: it is attributable to difficulties in disposing of surplus food stock by the normal trade channels. Some 30–40% of the United States agricultural exports are shipped under special programmes. This represents a contribution to the nutrition of the people of Asia and

4. Russell, W. R. *Brit. med. J.* 1947, ii, 1023.
5. Bodmin, D. *Amer. J. Hyg.* 1954, **60**, 339.
6. The State of Food and Agriculture 1958. F.A.O., Rome. Obtainable from H.M. Stationery Office, P.O. Box 569, London, S.E.1. Pp. 222. 12*s*. 6*d*.

elsewhere which, though far from negligible, cannot remove the widespread malnutrition. It would be foolish to expect any substantial increase in this aid.

LOCAL NITROGEN-MUSTARD TREATMENT

THE original nitrogen-mustard drugs have now been in use for twelve years or so and have been applied mainly to the treatment of chronic leukæmias and of Hodgkin's disease and the other reticuloses. Nitrogen mustard is a powerful antimitotic drug and has to be given intravenously in a running saline drip. Many modifications of the original drug have been prepared; some have been extensively tested, but few have passed into regular therapeutic use. Chlorambucil [1] can be given orally, and triethylene thiophosphoramide [2] can be given intramuscularly; but neither of these is as active or as powerful as the original drug. All drugs in this group are liable to cause aplastic anæmia if given in too large doses, and their usefulness in chronic leukæmias and reticuloses is due to the fact that these abnormal proliferations can be influenced before the danger of aplastic anæmia becomes serious. But when nitrogen-mustard treatment was applied to the control of inoperable cancer, such as bronchial carcinoma which was no longer resectable, it was soon found that, to influence the tumour significantly, it was necessary to give doses that were generally toxic and hazardous to life.

One way of overcoming this difficulty was suggested by Bateman et al.[3]; they cannulated a major artery supplying the tumour area, and if possible at the same time they temporarily occluded efferent veins; the nitrogen mustard was delivered in fractional doses via the arterial cannula. In this way they obtained increased effectiveness of the nitrogen mustard, but there was still enough general toxicity to prevent administration of large enough total doses to reduce the malignant tumour satisfactorily. A new approach has been made by Creech et al.[4] of New Orleans. They used an extracorporeal-circulation apparatus of the type provided for cardiac operations and showed that in dogs it was possible to exclude the limbs, the mid-gut, and the liver from the systemic circulation and to perfuse this at moderate flow-rates for about thirty minutes without producing any untoward effects. They used this method to find out how much nitrogen mustard or phenylalanine nitrogen mustard could be given safely, how long the action lasted, and whether increased oxygen tension enhanced the effect of mustard as it is claimed to do for radiotherapy [5]; by injecting Evans-blue dye they were able to confirm the effective isolation of the perfused area. Doses of 0·8–1·0 mg. nitrogen mustard per kg. body-weight, administered in three equal amounts at intervals of six minutes, were well tolerated; the perfused blood was found to be active for about eight minutes, and with phenylalanine nitrogen mustard for about two hours; oxygenating the blood seemed to be worth while.

Creech et al. have now applied the technique to the treatment of 24 patients with malignant neoplasms in various parts of the body. The extracorporeal circuit consisted of a 'Sigmamotor' pump and a disposable oxygenator of simple design; for the more elaborate arrangements needed for dealing with lung tumours a DeWall helix-reservoir type of bubble-oxygenator was used. The main artery and vein to the tumour area were exposed by dissection, and cannulas were inserted in them. In lesions of the lower limb the common femoral artery and vein were cannulated. In lesions of the pelvis the aorta and inferior vena cava were occluded below their renal branches and cannulated just above their bifurcations; pneumatic tourniquets were applied to the lower limbs to keep out the perfusion fluid. Clearly such arrangements called for considerable surgical skill.

One patient was a man of 76 who had had a malignant melanoma of the left foot, and about 175 secondaries had appeared locally on the leg and thigh; a groin gland biopsy showed no infiltration, but tumour cells were noted in a small lymphatic vessel. In this patient the left common femoral artery and vein were cannulated and 4 doses of 30 mg. of phenylalanine nitrogen mustard were administered at five-minute intervals; the perfusion lasted for twenty-three minutes; afterwards the cannulas were withdrawn and the vessels repaired. During the perfusion an Esmarch tourniquet was in position over the left iliac crest and the gluteal crease. The appearance of the limb remained normal throughout. After three weeks the metastases began to show changes, and eventually they faded away to a "freckle"; sections confirmed that the tumour cells had disappeared. No hæmatological changes appeared at any time. Eleven months after the perfusion 8 local tumours were present, though altered, and no new ones had appeared.

A second example was a girl of 18 who had had a supracondylar amputation of the left arm performed because a rhabdomysocarcoma had appeared in the forearm. Four months after the amputation a large mass appeared in the left axilla; and a tumour was also present in the amputation stump, which had become extremely painful. In this patient the perfusion was carried out through the left subclavian artery and the left innominate vein, which were exposed through a median sternotomy. Nitrogen mustard was perfused, a total dose of 30·8 mg. was administered in four equal portions given at five-minute intervals. The perfusion lasted for twenty minutes, and afterwards the vessels were repaired and the thoracic wound was closed. Pain in the amputation stump ceased almost at once; and in a month both tumours had shrunk, only a small nodule remaining in the left axilla. In this case the dye injection showed that the perfusion area had not been completely isolated; nevertheless no signs of toxic depression of blood formation appeared. Secondary tumours later developed elsewhere.

The most spectacular case was an attempt to reduce a pulmonary neoplasm.

The patient's right bronchus was obstructed by a neoplasm that extended on to the trachea; it was an epidermoid carcinoma and was considered unresectable. A double extracorporeal-circulation system was arranged, one to perfuse the pulmonary-artery system and one the systemic arterial supply. The nitrogen mustard was administered through the pulmonary circuit, and the operation was followed by progressive improvement in the radiographic signs in the chest and significant re-expansion of the right lung. But Creech et al. are doubtful about the value of this particular observation, and say that the case is of interest primarily because of the techniques of perfusion.

The unusual surgical skills needed for this kind of treatment are likely to prevent its use becoming widespread; yet it clearly has a place, especially in cases such as the first one described here. In the U.S.A. no doubt the method will be further tested for patients who cannot have other forms of treatment. In this country the small amount of apparatus for extracorporeal circulation and the few teams of operators are fully occupied in other directions.

1. Galton, D. A. G., Israels, L. G., Nabarro, J. D. N., Till, M. *Brit. med. J.* 1955, ii, 1172.
2. Leonard, B. J., Israëls, M. C. G., Wilkinson, J. F. *Lancet*, 1956, ii, 1017.
3. Bateman, J. C. S., Klopp, S. T., Cromer, J. K. *Blood*, 1951, **6**, 26.
4. Creech, A., Jr., Krementz, E. T., Ryan, R. F., Winblad, J. N. *Ann. Surg.* 1958, **148**, 616.
5. Churchill-Davidson, I., Sanger, C., Thomlinson, R. H. *Brit. J. Radiol.* 1957, **30**, 406.

Medical Education

WHEN the new Association for the Study of Medical Education held its first conference,[1] on Sept. 25, at the Royal College of Physicians of London, the opening address was given by Sir Russell Brain as the Association's first president. For those who did not hear it, we publish this address, followed by that of Dr. Lester Evans on the same day.

THE NEED FOR EXPERIMENT

Sir RUSSELL BRAIN
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PHYSICIAN TO THE LONDON HOSPITAL

THIS is a significant occasion. Institutions, and established social organisations such as the professions, resemble human beings in that they are never more than partially conscious. I do not mean that they are pathologically unconscious, though perhaps that is sometimes the case: I mean that mind, whether it is active in an individual or in an organisation, can never attend to more than a limited number of things at a time, and it manages to attend to those only by relegating many of its activities to the sphere of automatic reactions or, if you like, the unconscious. Consciousness exists to exercise choice—in Toynbee's words, to give the response to a challenge, which may come either from without, the environment, or from within, a threat indicated by a pain. As long as there is no challenge, and no choice, reactions can safely remain automatic, that is traditional.

This occasion is significant because it represents the conscious response to a challenge. Of course there is nothing new in an interest in medical education. For many years it has been a preoccupation of foundations, societies, and individuals all over the world; but, if I may use a neurological metaphor, all these have been hitherto in a sense activities at the reflex level. However valuable their function, the organism as a whole has been but dimly aware of them. But now the whole problem of medical education has emerged fully into consciousness, and the foundation of this Association means that the stimulus has reached one of the cortical layers and is rousing it to a state of activity which may ultimately lead to a motor response.

But though we may have become conscious of the need, I am by no means sure that we have become equally conscious of some of the assumptions we make when we talk about it. I think, therefore, that the most useful thing I can do is to ask a series of questions.

QUESTIONS

The first is, has education an aim? You must all have listened to many lectures and addresses on "the aims of education". But perhaps our suspicions should be aroused by the fact that educationalists find it necessary to discuss this question so often and at such length. Is there not some truth in the idea that education in general has hitherto for the most part been not so much pursuing an aim as looking for an aim to justify its pursuits? The present state of scientific and technological education in this country shows what comes of leaving education to the educationalists. Everybody will agree that it is better that people should be educated, whatever that may mean, than not. But, that being granted, it would seem that education has often been more of an art than a science, and has sought less to achieve an end than to carry out activities which seemed good in themselves, or perhaps which seemed good as ends, but only in themselves, and without considering their relationship to any total end of education. Of course, this process has been freely justified by rationalisations by which it is maintained that the methods employed aim at the effects they produce—i.e., people exhibiting certain desirable characteristics.

Now I have purposely exaggerated a little, but I would ask you to consider whether this has not in the past been to a large extent true of medical education. Have we had a conscious aim here, or have we, starting with the general idea that the qualified doctor must know something about A, B, C, D, and E, left it to the teachers of those subjects to teach them as ends in themselves rather than as means?

This brings me to my second question. I can already hear some of you replying to the first, that of course there has been (at any rate for the last century), an aim in medical education—namely, to ensure that before a doctor is allowed to practise he knows enough for it to be safe for him to do so. But several assumptions underlie this plausible statement. It is, of course, a requirement of the State, and as an ideal unchallengeable; but I rather enjoyed a passage which I read the other day in a review of a book about the Bar: "The examinations, which were only introduced as a sop to the educationists in the 1870s, who thought it was immoral to do anything in life without a test, are of no consequence. The highest place in a Bar examination (which is not difficult to obtain) brings in its wake no single brief." But it is no new thing for the Law to impose upon Medicine restrictions which it is careful to evade or take very lightly itself.

But a safe doctor is not the same thing as a good doctor. No doubt a good doctor will be a safe one, but a safe one will not necessarily be a good one. So we must go on to ask whether our present educational methods, related as they are to the criterion of State requirements, are those most likely to produce good doctors. This carries us a stage further, for we now have to inquire what is a good doctor, and that involves the further question, good for what? This idea of goodness in a doctor as itself a means and not an end raises a number of further questions. What is required of a general practitioner, for example, may differ considerably in relation to the part of the country in which he practises, still more in relation to the kind of facilities the State is prepared to give him, and will be influenced also by the kind of work done in hospitals and the amount of money the State is prepared to spend on consultants. Nevertheless, subject to some factors being outside the control of the medical profession, if we are to train men and women for this branch of medicine we should have a clear idea of its desirable scope and we must decide what should be the relationship between the basic training recognised by qualification and the more specialised skills involved alike in general practice and the long-established specialties. Having regard to all these variables, including the demands which society makes upon the doctor, we may need one kind of good doctor in the United Kingdom, another in the United States, and yet others in Australia or Nigeria.

But we are still making assumptions; for, if there may be different kinds of good doctor in relation to different national needs, may there not be different kinds of good doctor in relation to the same national needs? Is it not possible that one medical school might produce one kind of good doctor and another medical school another kind, and might they not, though different, both be equally good? And might not a country be the better for having

1. *Lancet*, Oct. 4, 1958, p. 733.

two or more different kinds of good doctor rather than one? And if this is true, can we devise a single universally applicable test which can recognise, and make allowances for, the different varieties of goodness in the doctors produced by different educational methods? And if we attempted to apply such a test would it work without having a restrictive effect upon those qualities of vision and creativeness upon which progress in medical education depends? Perhaps the answer to this is that, though we say that a doctor's training must be related to the functions he has to perform in his own particular society, we know that these variations are slight compared with the basic pattern of medical thought and practice, which is the same wherever a doctor is to work. In the words of the Royal College of Physicians' committee on medical teaching

> " to give, before registration, a full training for any branch of medicine has become impossible, and to try to do so has become harmful. Instead of a comprehensive vocational training the aim in future should be to give the student a basic professional education of high standard: he should acquire a soundly rooted stock of knowledge on which any branch can be grafted later. It is true that a great many facts must be assimilated by anyone who is going to do any kind of medical work; but, both for the future general practitioner and for the future specialist, factual knowledge is in the long run less important than the ability to learn and go on learning ".

This ability is difficult both to teach and to measure, but before we consider the possibilities of experiment in medical education it seems necessary to agree on the character of " a basic professional education " and on methods of ascertaining that the student has acquired it.

This brings us to the question of the relationship between medical teaching and examinations. We sometimes speak as if the examinations were a dead hand upon medical education. On the other hand there are some who have such a pathetic faith in them that they believe that the only way in which to get a medical student to take an interest in their subject is to have an examination paper, or at least a question in a paper, set upon it. What a comment on medical education! As I have implied earlier I believe the relationship between teaching and examinations is more subtle than this. While there is a sense in which the examinations determine the teaching, it is surely equally true that the teaching determines the examinations, and after all the same people are responsible for both. But there is more than this to examinations. We are all familiar with the candidate whose work and capacity we know from our own experience to be good, who is competent and intelligent, and who yet unaccountably fails in his examinations, sometimes repeatedly. It is easier perhaps to detect these unfortunates when they are taking postgraduate examinations than at earlier stages in their careers. We are apt to say " So-and-so should have got through, but he is a bad examinee ". This clearly means that in order to pass an examination it may be necessary to have not only the requisite knowledge and skill in medicine, but an additional skill in examination-passing. But then, we say, we must have examinations, and it's just too bad for poor old So-and-so. So, no doubt, muttered Procrustes.

FACTS, SKILLS, AND PRINCIPLES

When we really get down to fundamentals we find, as the college's committee soon discovered, that we are faced by some problems which are unsolved not only in medical education but in education generally, and which present themselves in medical education with particular complexity. Do we find in any other profession the same need for some knowledge in the most rapidly advancing fields of pure science, for skills which can be learnt only by imitation and practice, and for a knowledge of the human mind in all its diversity facing all the changes and chances of this mortal life? Small wonder that it is difficult for us to decide how to divide our educational emphasis between facts, skills, and the principles which are the tools of present and future thought. And this is the kernel of our problem. I have put skills in the middle, because properly interpreted they form a bridge uniting facts and principles. But the teaching and ascertainment of a skill present peculiar difficulties. There are lower-level skills, such as the examination of the patient, and higher-level skills, such as the art of diagnosis. The use of knowledge is itself a skill. Polanyi in his recent book *Personal Knowledge* has some wise things to say about this:

> " To learn by example is to submit to authority. You follow your master because you trust his manner of doing things even when you cannot analyse and account in detail for its effectiveness. By watching the master and emulating his efforts in the presence of his example, the apprentice unconsciously picks up the rules of the art, including those which are not explicitly known to the master himself."

The important point here is that the apprentice " unconsciously picks up the rules ", including those of which his master himself is unconscious.

Perhaps the truth about medical education in this country is something like this. We are good at skills and on the whole distrust definitions, and we make our definitions work by means of skills which are often undefinable. Until recently our medical curriculum has worked reasonably well on this basis. It worked because what was done in medical teaching was both more and less than what the regulations advised. The fewer and larger the subjects the greater the scope for their interpretation. We can cope with a curriculum of half a dozen major subjects in this way, but not with a dozen or more.

Now if this is true, and if medicine involves a large number of skills integrating the facts and the principles, and if the teaching of it is also a skill, which cannot be entirely defined in logical terms, it would seem that our current approach to medical education should involve a recognised element of experiment. If so, our task must be to adapt it to a conscious aim, and to reconcile it with real safeguards reasonably required for the purpose of State recognition.

MEDICAL EDUCATION IN PERSPECTIVE

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THE various elements of medical education—preclinical or clinical, research or practice, laboratory or bedside—bear a relationship to each other not unlike the separate parts of a living organism: no part is functionally effective except in relation to all the others. The medical school and medical curriculum is merely a stage through which the future doctor, teacher, or research-worker passes on his path of growth. Learning from the natural and social sciences, experience in hospitals and clinics, and in the laboratory and at the bedside, are all part of the preparation of the physician and surgeon to deal with another human being's problems.

Nor does the doctor any longer perform his job alone. However, he remains the key figure in a vast complex of professional services, technological skills, and organisations, both private and public, which comprise modern medicine.

I believe that every so often we must take a fresh look at the patient as the reason for medicine and at the student as the reason for medical education and the medical school. Involvement with the intricacies of the means toward an end often blurs the vision of the real goal. I am often reminded of the comment made by the late Professor Stampar of the University of Zagreb when visiting a newly created department of preventive medicine in America. On being shown the new microscopes, one for each student, he shrugged his shoulders and remarked that in his country they used telescopes!

Although neither historian nor prophet I am tempted to take a quick telescopic view of the changing medical scene in which our future doctors must find their places. We can now see clearly, I think, that if modern scientific medicine is to continue to grow—or rather, if it is to become more scientific in the sense of dealing with variables which heretofore were not reckoned with—its range of inquiry must also extend into the social and behavioural sciences. I believe that we are in fact in the early stages of a three- or four-decade swing which may prove fully as significant socially and scientifically as the final decades of the last century which we now view as the gestation period of scientific medicine. Further, medicine is increasingly viewed as a function and responsibility of the whole of society and as such transcends the proprietary interests of the practising professions, service agencies, or educational institutions. How then is it possible for the educational and research institution—the medical school—to pace the movement, let alone keep up with it? I believe the answer lies with groups such as this.

THE UNIVERSITY AND THE PATIENT

Medical education is now firmly established as a university responsibility and must remain so if we are to look toward the future. The university is the one institution in our society which by action has obligated itself to anticipate the future. It is the storehouse of knowledge and the interpreter of the route through which man has become what he is: it engages in fundamental research which opens up new avenues of progress; and it educates young people who can only look ahead. A further significant fact is that medicine is the only discipline which must be practised and demonstrated in its entirety—whether in the laboratory, the ward, the clinic, or the community—in order to be taught by a university faculty. Thus, the primary question for a university faculty is the extent to which it is able to conduct patient-care programmes which permit the extension of research into the nature and cause of currently pressing health problems and programmes in which the student will envision the future.

Two related characteristics of the medical work of universities today are, first, a greater interest in the ambulant patient, and secondly an effort to view the patient's stay in hospital as less of an isolated medical episode —to look at his problem through time as well as in relation to his total living situation. This seems logical if the acute phase of illness is to be understood in relation to what has gone before or is to follow; if the handicapping conditions of the elderly are to be dealt with preventively: if the patient's human associations and environment are to be dealt with in unravelling the intricacies of mental disease; or if the biology of human reproduction must be learnt as a step toward the prevention of congenital anomalies and faulty development of the child.

Medical faculties are already setting the stage for research on these problems by bringing into play the techniques and instruments of scientific medicine with which we are familiar and by developing new ones. While the laboratory side of this kind of investigation creates new demands on the medical and natural sciences, the community and environmental aspects call for virtually untested help from the social and behavioural sciences. The latter will very likely undergo growth just as some of the natural sciences did when applied to medicine. Study of patients' problems in this manner will stimulate —as indeed it already has—critical scrutiny of the medical and allied health professions, the hospitals and clinics, and the organisations charged with providing service to the public. Within the university and medical faculty, interdisciplinary and interdepartmental collaboration grows almost unnoticed when we try to find out what really happens to patients and why.

THE UNIVERSITY AND THE STUDENT

When the student enters medical school he is still at a stage in his growth where, like any other young animal, he wants to explore and roam. Also, like all living things, he will respond in kind to his environment. If it is one of freedom and inquiry, he can become a learner along with his teachers. Specifically, a new and unsuspected stimulus may be added to the study of medicine if the student senses that the patient is clearly the object of inquiry. Traditionally, medical education has been discussed in terms of curriculum—content and sequence of subject matter and methods of teaching—but if it can also be viewed in terms of the student's learning needs, then planning the educational environment may be approached in a somewhat different fashion. There has now been enough experiment, or innovation, in curricula to give an idea of whether we are moving in the right direction. My belief is that we are.

In the first place it seems to be possible for faculties to devise such educational programmes as each deems wise, taking into account the tradition or situation of the particular school. Likewise they can select, so far as they are able, a student body likely to fulfil the purposes of the school. The sciences on which medicine is based may be presented separately or collectively, briefly or in detail, but always with an eye on the student's optimum learning in both depth and breadth. The student may be started on the study of the human being at such time and in such manner as is judged most suitable for him to begin acquiring insight and skill in interpersonal relationships without which medicine is a mere technology.

There is no dearth of opportunity to learn what must be known about human disease; but it is harder to make sure that the student has been started upon the road to becoming a truly professional person. I have no doubt that, if the necessity is realised, medical faculties—even in these changing times—can provide an educational environment in which a student can become such a person. At the risk of stating the obvious I should like to quote from Seward Hiltner, professor of pastoral theology at the University of Chicago:

1. The professional person operates from a knowledge of basic principles; he is a learned man.

2. The professional person operates through technical means, but in mastery of techniques, not in subordination to them.

3. The professional man operates directly for human welfare.

4. The professional person operates responsibly. . . . He does not pass on a task to others because it is difficult, but rather because someone else is better equipped to deal with it.

5. The professional man operates as a representative of a group which, collectively, is called a profession. . . . What he does and how he does it affects the whole group which he represents. In his dealings with clients, patients, parishioners, or students what he does always transcends himself.

OBLIGATION AND OBJECTIVE

In these brief remarks I have accepted the thesis that medical education is rightly a university responsibility and that by being a part of the university the medical faculty accepts the university's obligation to anticipate the future. I have ventured the opinion that this is especially important now when medicine is undergoing rapid social and scientific growth. I have reasoned that to meet this obligation the medical faculty and the university must apply research skills (emanating from all fields of knowledge) to the broadest possible study of (1) the patient's needs and care and (2) the student's learning process. These two objectives in research, pursued together, mean simply research in medical education. Their attainment will assure that the student will become a professional person. In doing so he will have achieved an awareness of the nature and behaviour of man, an awareness of the human being in relation to others, an awareness of the physical, biological, and cultural world in which people live, and an awareness of himself in relation to other people and his own environment. Finally, he should be capable of the quality of leadership which society expects of him.

The Wider World

CHILDREN IN THE U.S.S.R.
WORK ON MENTAL AND PHYSICAL HANDICAPS

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LAST June I went for three weeks to the Soviet Union as a consultant to the World Health Organisation. Since I went specifically to inquire about work in mental health and on handicapped children, I probably saw more in this field than previous medical visitors (Brockington 1956, Fox 1954, Kirman 1954). Prof. A. R. Luria, the leading Russian psychologist doing research on mental subnormality, who speaks English fluently, gave a great deal of time to making my stay both profitable and happy.

ORGANISATION

The basic unit of the health service is the *policlinic*, which gives general medical care to the whole population, including children. For example, Moscow is divided into twenty administrative departments, each with four or five policlinics. These policlinics have no beds. They all have a psychiatrist on their staff.

Children with psychiatric problems which cannot be dealt with by the school authorities or the policlinic are referred to the local *psychiatric dispensary*—a special clinic without beds. Moscow has a dispensary of this kind for each of the twenty administrative districts, and also a central one which receives difficult cases and issues directives. Doctors at the dispensary work with the schools and families.

For the small proportion of children whose needs cannot be met by the policlinic or dispensary there are special services—both educational and medical—provided free of charge.

The Mentally Backward

Children whom we would call educationally subnormal are educated in special schools which aim to take something under 1% of the school population.

In the Russian Federated Republic (total population 113 million) there are 30,000 educationally subnormal children in special schools and an estimated 18,000 cases not yet ascertained. This group contains some physically handicapped children. There are 301 schools, including 130 boarding-schools from which the children go home for holidays, and 70 in which children live permanently. Even in cities the proportion of boarding-schools may be high—Leningrad has 8 special schools for educationally subnormal children of which 3 are boarding-schools.

Educationally subnormal children generally spend about a year in ordinary school (which begins at the age of 7) before being transferred to special schools. In about 10% of cases they go straight to special schools. I got the impression that few return to ordinary schools after being once transferred to a special school. The education includes a solid grounding in reading, writing, and arithmetic, elementary knowledge of the natural sciences, geography, history, civics, and drawing, singing, and physical education. During the last five years of schooling increasing emphasis is placed on vocational and trade training. Of those who leave special schools, over 90% are employed in ordinary work. Rural areas present special problems which, the Russians say, need further study.

Special schools for the mentally backward commonly have a doctor and one or two nurses or feldshers on the staff. The headmaster or director of the school is responsible for the curriculum. The Ministry of Education has special departments dealing with organisation and inspection; and an intellectual lead is given by the Institute of Defectology in Moscow. There is another such institute in Kiev, and teachers' training colleges have departments in defectology.

For imbeciles and idiots, who are the responsibility of the Ministry of Social Welfare, there are special hospitals and day centres. Adult defectives who are unemployable receive an allowance from the same source or are placed in special institutions organised by this Ministry.

Neurosis and Psychosis

Neurotic and psychotic children who need hospital care go to *clinics* (psychiatric inpatient hospitals) which take a wide variety of cases and provide education, social training, and games as well as treatment. Some neurotic children go to *sanatoria* (residential hospital schools under the control of the education authority). The average stay in clinics and sanatoria is about three months. Clinics tend to take acute cases, with problems which are primarily medical; sanatoria take "asthenic" children with problems of management, or personality disturbances attributed to disorders of higher nervous activity. There are also some day schools for maladjusted children.

Without more information than I obtained one cannot compare the amount of provision for maladjusted children with that of other countries. The physicians in the psychiatric hospitals and dispensaries did not speak of waiting-lists; but in the health service—in contrast to the educational service—I obtained no overall statistics worth

reporting. I do know, however, that the provision in Moscow and in Leningrad is considerable.

Of the psychiatric hospitals I visited, the Kashenkov Hospital in Moscow has 240 beds for children and admits about 1350 children annually, while the Soloviev Hospital has 50 beds; between them they have more psychiatric beds for children than there are in London outside the mental-deficiency service. Likewise in Leningrad the Institute for Child Psychiatry has 175 beds and the Bechterev Institute 45. In both cities there are other mental hospitals, which I did not see, which also have beds for children. I had the impression both that children tended to be sent for inpatient treatment more readily than here (possibly because the housing shortage makes it harder to treat very disturbed children at home), and also that the physicians thought the number of beds sufficient for the need.

Sensory Defects

Children with sensory defects, such as deafness or blindness, go to special schools, mainly boarding-schools.

There are 65 schools for the blind in the Russian Federated Republic, with a total of 8000 to 9000 pupils, and 80 in the U.S.S.R. as a whole. Other schools take partially sighted children.

For the deaf, Moscow and Leningrad have 3 schools, with about 300 children in each. In the Russian Federated Republic there are more than 200 schools, and in the U.S.S.R. about 250. There are special schools for partially deaf children (loss of 30 to 80 decibels). Deaf and partly deaf children total about 24,000, and on the average there are 100 pupils in each school.

Personnel

Teachers of the mentally subnormal have a five-year training in the department of defectology of the teachers' training colleges as against the three-year training for ordinary teachers in country districts, and the four or five years in the cities. Teachers of ordinary children who wish to teach the mentally handicapped must have additional training. Psychiatric nurses have a training of two or three years: nursing assistants get some training on the job. There is no shortage of nurses in hospitals: they work only a six-hour day (thirty-six hour week) and in children's hospitals have two months' paid holiday a year. Psychiatric nurses are paid more than general nurses. Nursing is a coveted position and married women with children find it particularly attractive.

HOSPITALS AND INSTITUTIONS

The most striking thing about all the institutions I visited was the large number of staff.

A day school for 230 educationally subnormal children (20 imbeciles and the rest of higher grade) had a doctor and 2 feldshers on the staff and a truly formidable number of teachers. A residential institution for 60 trainable, physically healthy, imbecile children, aged 8 to 17, had a staff of 32; another larger one near Leningrad with 210 children (75 high-grade imbeciles, 80 low-grade imbeciles, and 55 idiots, including 23 cot cases) had a staff of 107.

In children's psychiatric hospitals the staff was lavish. The Leningrad Institute of Child Psychiatry (175 beds for children between 5 and 16 years of age) had a staff of 187. Soloviev Clinic (50 beds) had 3 physicians, 4 teachers, 20 nurses, and 27 auxiliary staff including nursing assistants.

When I first arrived, I kept wondering, as previous visitors had done, how so many doctors spend their time all day looking after handicapped children who appear for the most part to be physically healthy and robust. The answer is: they give active treatment. They have much faith in hormone treatments, pharmacological measures, psychotherapy, diet, massage, and exercise, and they closely supervise the work of medical auxiliaries, such as physiotherapists and speech therapists. They also work closely with teachers.

A good feature of all the hospitals I saw, whether for children or adults, was that there were no dormitories with more than 20 beds; the median size was about 16. Some dormitories were very crowded, but all had their separate day-rooms. I was told that Russia, even before the Revolution, did not have the large dormitories so characteristic of our old mental hospitals. In mental hospitals for adults one finds small wards, overcrowding, a large number of nurses, many doctors, and much active treatment, including physical treatment and chemotherapy, work therapy, psychotherapy, outpatient services, and work with families. Kashenkov Psychiatric Clinic, a 2400-bed general psychiatric hospital, to which is attached the Central Institute of Psychiatry, and the children's department already mentioned, probably exemplifies what is best in mental-hospital practice in the U.S.S.R., though in size at least it is probably not typical.

It is meant for acute cases and is responsible for the total care of the patient, including treatment, social work with the families, and finding employment. There is a farm attached to it. Admissions are 10,000 a year, half the patients being men. Adults spend, on the average, 85 days in hospital. The staff includes 160 physicians, 625 nurses, over 1000 ancillaries, and 300 domestic and kitchen staff.

Admissions were classified as: 20–25% schizophrenics, 8% epileptics, 6% organic lesions of the central nervous system, 3·5% presenile conditions, 7·5% senile conditions, 2% post-infective, 6% ateriosclerotic, 18% alcohol psychosis and chronic alcoholism, 7·5% neurotics, and 13% psychopaths. Only 8 cases of manic-depressive psychosis were admitted in 1957. In this and other hospitals I was puzzled at finding so few patients diagnosed as suffering from depression or manic-depressive psychosis. Differences in terminology may be largely responsible, but there may be other factors.

Much physical treatment is carried on (hormones, diet, physiotherapy, drugs) and there are units in which various forms of sleep treatment are studied—sleep combined with insulin, interrupted as opposed to continuous sleep, conditioned sleep, and electric sleep. (In this hospital, as in the others I visited, sleep treatment is now used only as an auxiliary form of therapy, and does not enjoy the popularity it did a few years ago.) There is also a very large unit for hydrotherapy and other forms of spa treatment. Psychotherapy, on lines well summarised by Wortis (1950), is practised by physicians. The doctors spoke warmly of the contribution made by the ataraxic drugs—notably chlorpromazine and to a less extent reserpine—on which clinical trials are being carried out. Little use is made of electroconvulsion therapy. Leucotomy is prohibited in the Soviet Union.

In Kashenkov Hospital, as in others, there were many locked doors and many patients were in bed. Others worked in workshops and on the farm. The children's department and the Institute of Psychiatry were set well apart from the rest of the hospital.

My overall impression—inevitably very superficial—was of a large and busy hospital which would not be considered remarkable in this country. Standard methods of treatment were used, and, as in the other hospitals I visited, there appeared to be full range of supporting services.

Plans for New Mental Hospitals

Dr. Babaian of the Ministry of Health showed me plans for rebuilding mental hospitals throughout the U.S.S.R. Three types are planned—60-bed units in general hospitals, 300-bed hospitals (in cities) for acute cases, and 600-bed hospitals (outside cities) for chronic patients. The larger hospitals are to be divided into separate two-storey buildings, each occupied by about 100 patients in four

ward units. Each unit will have its own diningroom, recreation room, dormitories, and courtyard: there will be rooms for visitors, and separate entrances for patients and visitors. Clinical rooms, laboratories, workshops, recreation rooms, and auxiliary services are numerous and intelligently planned. The separate buildings will be surrounded by lawns and open spaces, and children's units will be set apart from those for adults.

Small Ward Units

The majority of dormitories will have three beds; but there will also be rooms with one or six beds, to be used according to the patients' needs.

The first of these hospitals is now being built, and, with local variations, they will supplement and then replace most of the existing ones.

Salaries

The salary structure is somewhat different from that in Western Europe, and has changed considerably since before the second world war, when academic people were on the whole not well paid.

In one hospital for maladjusted children the director receives 1600–1800 roubles a month and physicians 1000–1600; nurses have a basic salary of 500–600 roubles a month, nursing assistants 350–400, domestic workers 400, and teachers 800–1100. (Teachers of educational subnormal children are paid 25% more than this.) Research-workers and university teachers are well paid, especially if they earn higher qualifications. A university graduate gets 1000–1200 roubles a month, a candidate of science 1700–2500, a doctor of science 3500, and the head of a department 4500. A senior research-worker may hold more than one appointment and be paid for each. A member of an Academy (a rare distinction) receives an additional 3500 roubles a month, a corresponding member 1750. By contrast, a senior medical official in the Ministry of Health may receive only 1500.

These facts help to explain some features of the Soviet scene which are otherwise puzzling to an outsider—the abundance of nurses, the level of work in clinical medicine and administration, and the brilliance of much research in the basic and applied sciences. Science in the Soviet Union enjoys enormous prestige; research facilities are great, and it clearly attracts the ablest minds.

RESEARCH ON HANDICAPS

Much of the most interesting work on children is being done at the Institute of Defectology, where I spent several days. For English readers a more informative title would be Institute for the Scientific Study of Handicapped Children.

Founded in the 1930s by the great Russian psychologist, Vigotsky, the institute was reorganised after the war and became one of the constituents of the Academy of Pedagogical Sciences. It has a full-time administrative director and a scientific staff of more than 50; and, because of its high reputation and its association with Moscow University, it can attract and keep good staff.

I was particularly interested in work on children with sensory or motor handicaps and on problems of higher nervous activity—fields in which the institute specialises. In other fields such as childhood schizophrenia, the treatment of mongols, and the education of imbeciles, I saw nothing remarkable during my visit to the U.S.S.R.

Educational Aids for the Blind

I was shown a device consisting of a photoelectric cell connected to a signal generator which can be made to emit a sound, or to change the pitch of a continuous sound, when a change in illumination occurs. By such a device a blind child can learn to explore its spatial environment. With practice an accurate silhouette of a tree "seen" 50 yards away through a window can be drawn by a blind child using a specially constructed drawing-board with pins which can be fitted into holes.

I also saw the reading-machine which can convert ordinary printed type either into raised braille characters or into sounds. It can be adjusted to read type of different sizes. At present its capacity—determined by the speed of the human receiver—is about 300 letters a minute.

Deaf and Hard of Hearing

A deaf child is taught to speak first by means of a manual alphabet and only later by lip-reading. To begin with lip-reading alone is thought to set the young child too hard a task. The present methods have been used over the past five or six years and are now applied in about a quarter of the schools for the deaf in the Soviet Union. The teacher begins by using both the manual alphabet and spoken speech simultaneously, and the child picks up manual speech before oral speech (as has also been shown by electroencephalographic studies). Gradually, a "functional system" is built up in which the oral speech is grafted on to the manual speech.

An abbreviated system of phonemes has been worked out to provide an easier basis for the acquisition of manual language.

Work on the Deaf and Blind

Fascinating work is being done on the rare double sensory handicap of deafness and blindness in children whose brains are unimpaired.

One such person, Dr. Skorohodova, a Russian Helen Keller, works as a psychologist in the institution and has published two books as well as a volume of poetry. At present two deaf-blind children are being educated there and a further dozen or so are in other institutes in the Soviet Union. The methods of instruction used are a logical extension of those used with deaf children, but great ingenuity has been shown in the development of a rational approach to the problem of making contact with these children.

A Study of Conjoined Twins

Problems which in their human implications at least are similar to those of the blind and deaf arise in the case of conjoined twins, one set of whom is being investigated by Professor Anokhin, director of the Sechenov Institute in Moscow.

The girls—Macha and Dacha—were born in 1950. They are separate from the waist up, each having a heart, lungs, and liver, and a separate digestive tract, terminating in a common anus. Their vertebral columns are separate, being joined at the coccyx. They have a common pelvis. Each nervous system is autonomous and each girl controls the use of one of the two functioning legs. The third leg, which is slightly atrophied and ends in a double foot, is under the nervous control of both twins. They share a blood-supply.

The girls, with separate nervous systems and a common blood-supply, permit one to ask questions about the relations between nervous and humoral factors in the regulation of functions, and Professor Anokhin's primary interest is in the scientific problems presented by this experiment of Nature. I was more fascinated by its human and educational aspects, and by his concern over these; for the girls, now 7 years old, are of normal intelligence; they are pretty children—happy, affectionate, and mischievous. A teacher gives them lessons, and they are said to be apt pupils. Despite their extraordinary handicap, they can walk, ride a tricycle, and appear able to lead a surprisingly normal life. It is clear that, far from being objects of horror or derision, they are very well cared for, lovingly and without sentimentality or false pity.

Professor Anokhin hopes that, like Dr. Skorohodova, they will become scientists when they grow up, using the fact of their handicap to contribute to our knowledge of physiology.

Whether they become themselves creative scientists or whether, like Tom, the laboratory assistant of Wolff and Wolf, they participate in studies designed by others, will no doubt depend on their native endowment and their response to the education that will be planned for them.

HIGHER NERVOUS ACTIVITY

In psychological research the greatest efforts are being made in study of the function of the brain as an organ—the problem to which Pavlov devoted the latter half of his life.

Until very recently, the work done on man has contributed relatively little to our understanding of specifically human problems of neurophysiology. Much of it was characterised by a rigid orthodoxy which found its clearest expression in the Pavlov Conference of 1951, called to consider the relation of Pavlov's work to the problems of medicine. But, whatever may have been the intellectual climate of a few years ago, the situation today is healthy. I found Russian scientists condemning political interference in science: science, they said, suffered during this period; but the mistakes had been recognised and were unlikely to be repeated. They added that there are now many more scientists, and they are in a much stronger position. It is certainly true that many of those taken to task during the Pavlov session now enjoy positions of great distinction and have access to splendid facilities for research.

Speech and Mental Development

Luria and his colleagues are interested in the role of speech in mental development. They trace the evolution of speech through several stages. At first, speech has no self-regulatory influence over a child's activity; later it can initiate activity but not inhibit it; and only during the first years of school life does the " regulatory " role of language over action begin to develop. The acquisition of language —the " second signalling system "—is thus seen as occurring in a definite sequence, and in normal children the stage of development will depend largely on the child's age. In mental defectives damage to the higher centres is thought to retard linguistic development. Even when speech itself is well developed, there is a lack of connection, or a partial dissociation, between speech and behaviour. In the education of mentally subnormal children, therefore, special attention must be paid to speech, since without effective language not only is their communication with others impeded, but their powers of self-regulation will remain primitive.

Because of the nature of the cortical damage from which true defectives suffer, the amount of linguistic development possible may not be great. The case is quite different with children who suffer from mental handicaps caused by, for example, partial deafness, which leads to backwardness in speech, and apparent mental defect. Here the capacity to make use of language can be developed because the brain is intact. Soviet psychologists have developed sophisticated methods of differential diagnosis of partial handicaps. Their ideas have been ably expounded by Professor Luria in three lectures given in the University of London in 1956, and in forthcoming publications in English.

Experimental Techniques

A standard situation in which to investigate problems of higher nervous activity is one in which the subject is seated before a display panel and given a rubber bulb to press according to instruction. The extent and latency of the response, as well as the number of false responses, are recorded under different experimental conditions, and the results are analysed to show the functioning of higher nervous activity under different conditions, or in different types of nervous system.

The apparatus used at the Institute of Defectology is simple but adequate. Paper is driven at a constant speed by an electric motor with a variable drive, the rubber bulb held by the subject being connected by tubing to a tambour, which operates a siphon-fed pen to give continuous written records of all changes of pressure on the bulb. Other pens record, alongside, the stimuli presented to the subject. The display panel can be varied to suit the conditions of the experiment. A standard piece of equipment is a black box about 8 in. square, with a ground-glass front. Inside are coloured lights (white, yellow, red, green, blue), two bells which differ in pitch, and a buzzer. These can be switched on and off as required by the experimenter, who sits with the apparatus in another room. An account of the technique, in many ways similar to the one now in use, was given by Ivanov-Smolensky, who first developed it, in *Brain*, 1927.

If the subject is asked to make a manual response each time a light appears, a conditioned reflex can be quickly established even by children 4 or 5 years old, or mentally deficient children somewhat older. (The simplicity of the task and the ease of establishing a conditioned response make the technique very useful.) Differentiations can be established by having the subject respond to lights of one colour but not to another, or to a short signal but not to a long one, and his ability to respond to complex instructions (e.g., to press to the red light but only to every second green one) can be easily tested. Using this technique one can study the speed of formation of stable response patterns, the stability over time, the subject's ability to change from one set of responses to another (rigidity or perseveration), and the role of speech in regulating voluntary behaviour.

It is found that excitable children tend not to inhibit responses when given negative stimuli to differentiate from positive ones, whereas inhibited children, after a series of negative stimuli, tend to respond less and less to positive ones. In children of normal intelligence who show erratic manual performance, speech tends to have a regulative influence. That is, if the child is asked to say " Press " each time he makes a manual response, and to say " No " each time he is meant not to respond, the variability in *manual* responses is greatly reduced. Mentally deficient children, however, do not benefit anything like so much from the use of speech coupled with manual performance.

Likewise, even though they are able to repeat instructions (e.g., to press to the red light, not to the green one), mentally subnormal children will continue to press each time a light appears, irrespective of its colour. The primary system of sensorimotor connections is said to be partially dissociated from the secondary system (speech).

Again, it is found that mental defectives are characterised by perseveration (inertia). If asked to obey one set of instructions (e.g., to press to a green light and not to a red), and later to obey a second and contradictory set of instructions (to press to a red light but not to a green), they are likely to revert to the first set as fatigue (inhibition) supervenes. Qualitative factors including performance can be easily studied if continuous polygraphic records of what happens during the experiment are kept: tests that result merely in global scores often obscure the happenings during an experiment.

The same apparatus is used to investigate weaknesses in different " analysers " in patients suffering from lesions of the central nervous system. In mental defectives cortical weaknesses are usually general, and are not confined to the acoustic, visual, or motor apparatus; in patients with traumatic lesions weaknesses of particular sensory or motor functions may be discovered in clinical investigations in which they are asked to respond to stimuli of different complexity and in different modalities, or to make responses which are more or less complicated. Responses to complex signals are easily investigated by, for example, asking a subject to press twice to a single light and once to a pair of lights.

In using techniques of this kind the Russians are in general interested in the mechanisms of behaviour displayed under various experimental conditions rather than in the level of performance as such.

The Ivanov-Smolensky box, if one may call it that, is only one of a number of techniques used in investigations of physiological properties of the cerebral cortex. Extensive work is also being carried out with the skin galvanometer, the plethysmograph, and the electroencephalograph and electromyograph, and on different forms of conditioned motor response, such as conditioned eyeblink. Very fine work, which is too briefly summarised in Simon (1957), is being done by Sokolov and others on orienting reflexes. The sensitivity of different "systems"—electrophysiological, vegetative, and somatic—to signals of different sorts is being examined both in normal people and in psychiatric patients.

The work on physiological mechanisms seemed to me good, but I was less happy about the typological classification of patients or syndromes which followed. On the basis of intensive study of typical cases Pevsner, for example, divides defectives into four categories:

1. *Stable* defectives suffering from diffuse lesions primarily of the cortex.

2. *Unstable* defectives with diffuse cortical lesions and involvement of the basal ganglion and, sometimes, hydrocephalus and abnormalities of the cerebrospinal fluid. Such patients have not only the inertness of cortical processes characterising the first group, and leading to lack of the ability to abstract and to defects of cognitive processes, but also have the balance of their cortical processes disturbed. They are thus hyperexcitable or hyperinhibitable.

3. The third goup have diffuse lesions together with specific lesions in the posterior parts of the brain and are characterised by aphasia, agnosia, or the amnestic syndrome.

4. Finally, there are defectives with diffuse lesions together with local lesions in the frontal lobes. Their defects include both disorders of personality and defects in complex motor coordination.

These ideas are interesting, but the classification is perhaps too simple. Likewise, the classification of children as feebleminded or asthenic, or as excitatory or inhibitory, can only be regarded as a first and possibly misleading approximation in the difficult task of classifying disorders of personality or types of personality. There is a great need for statistical techniques to be used in this work. It may be argued that, in the present state of knowledge, research on higher nervous mechanism should not be confined too narrowly by the rigours of experimental methodology. None the less, the need for strict testing of the theoretical structure will become increasingly important as the theories themselves begin to take more shape. Otherwise, in science as in clinical medicine, we shall be faced with the perpetuation of false orthodoxies.

IMPRESSIONS AND CONCLUSIONS

Diagnosis

In some fields, methods of investigation seemed more comprehensive than those I have seen elsewhere.

For example, extensive work is being done on the diagnosis of hearing defects, and objective methods of audiometry (to supplement subjective methods) are well developed. The plethysmogram, electroencephalogram, galvanic skin response, conditioned eyeblink, and eye movements in response to sound are studied. To assess the hearing of babies, Professor Bronstein in Leningrad uses the sucking reflex, which is inhibited by sounds invoking an orienting reflex.

At the case conference I attended at the Institute of Defectology in which cases of mental defect and of neurosis were shown and methods of differential diagnosis illustrated, information about the child under investigation was presented from many sources. Medical history, school reports and teachers' comments, results of psychological investigations (on qualitative lines), parents' comments, investigations of higher nervous activity, and medical and psychiatric data were included. While much of the information was of a kind one would expect in any good clinic, there were some special features. The work on higher nervous activity is more sophisticated than that in other countries; also the school reports were unusually comprehensive. On the other hand, no use is made of intelligence tests, and I found a good deal of hostility towards intelligence tests, and some misunderstanding (as I thought) and prejudice about their usefulness in the psychiatric clinic.

Services

The services are remarkable in being so generously staffed. Of particular importance is the abundance of nurses. I made no inquiries about the quality of their training and the level of their competence, but I have no reason to suppose that these are inferior to those of other countries. Since there are so many doctors, who supervise the work of the nurses more closely than is possible in most other countries, one might expect nursing to reach the standard demanded by the medical staff.

By Western European standards, the proportion of doctors is high. I was rather sceptical of the value of some of the widely used specific treatments, both for children and for adults; some of the medical scientists I met also had reservations about the therapeutic zeal of their clinical colleagues. Clinical trials with appropriate controls seem to be needed.

Other visitors to the U.S.S.R. have commented on the inadequacy of the statistical information obtainable from official sources. One suspects that the paucity of published information must lead to a lack of interest in epidemiology.

Patterns of child-rearing in the U.S.S.R. differ in important respects from those of much of Western Europe. From birth the average child probably sees, and is handled by, more adults than is the case in, let us say, many suburban districts in England. Physical and social isolation of families and of individuals must be rare, at least in the cities. In consequence, somewhat different mental health problems are likely to arise: for instance, I doubt whether, in a city such as Moscow, admission of a child to hospital would often result in serious trauma.

Children's hospitals take patients with many different handicaps, but institutions for long-stay care are extremely specialised. (For example, idiot children are being separated from imbeciles.) I was not convinced that such specialisation is in the best interests of either children or staff.

It must be added that, if the plans for new mental hospitals are carried through within the next few years, the mental hospital accommodation in the Soviet Union will be outstanding.

Research

Psychological research in the U.S.S.R. is large in quantity and much of it is of high quality. The laboratories I visited were extremely well equipped with both Soviet and foreign apparatus. The originality of much of the work impressed me greatly.

In the fields in which they are interested the Soviet scientists were well informed about work being done in other countries. Many scientists read English though few speak it.

Team-work among scientists with different training—

e.g., electrophysiologists, neurologists, and psychologists —was common; the relations between staff of different status and between staff and patients, both in the research institutes and in hospitals, appeared good.

Though much of the research has not yet resulted in direct advances in treatment, there can be little doubt that such applications will come in time. At present the emphasis is on building the basic medical sciences, and it is research, both fundamental and applied, which attracts the ablest people.

As already mentioned, the work on psychophysiological mechanisms of higher nervous activity seemed better planned than did much of the work on taxonomy. The greatest weaknesses in the research I saw seemed to me to be in experimental design and statistics.

I met no-one interested in human genetics and its recent developments, or in the genetics of the specific diseases that contribute to the condition of mental deficiency.

The orientation of nearly all of the work I saw was "psycho-neurological." More strictly psychological work —e.g., the study of motivation, emotion, and conflict— is not so advanced. Several Soviet psychologists commented on the weakness of the research in these fields and spoke of the need to develop a scientific approach to emotional problems.

In my brief visit I saw little of the research being done in social psychiatry or devoted to work therapy, to which much attention is paid; and I formed no impression of the quality of such research, which has been described by Wortis (1950).

The Soviet scientists and doctors were eager to exchange information and to show me what they were doing. They asked many questions about what is being done in England. Reprints of articles and books (10 kg. in weight) were given to me to take home. I was able to secure several papers for publication in English journals and the question of exchanges of scientific personnel between the Soviet Union and England was fruitfully discussed.

Throughout my stay in the U.S.S.R. I was treated with very great hospitality, both official and private. The kindness shown to me by my Soviet hosts, especially Professor Luria, was unforgettable, and it is a pleasure to acknowledge it here.

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Special Articles

THE WORK OF C.I.O.M.S.

FROM A CORRESPONDENT

SINCE its creation in 1949, the Council for International Organisations of Medical Sciences (C.I.O.M.S.) has been concerned with the coordination of international congresses and with the improvement of their standards. When the general assembly of the council met recently in Paris, representatives of 46 non-governmental medical organisations reviewed past achievements and thought about future plans.

A rapid growth of medical sciences and a concomitant increase in specialisation and ease of travel would, in logic, lead to a greater number of highly specialised meetings with limited interests and attendances. And this is what is happening. Symposia have lately flourished: these small meetings of 20–25 persons, lasting four or five days, permit advanced discussions between internationally known scientists; and they have proved of much value in advancing scientific knowledge, devising practical projects (particularly those involving several disciplines), and planning research. But these meetings are difficult to organise effectively, and the selection of their members presents many problems.

Symposia seem a logical new development, and the large international congresses, run on conventional lines with thousands of participants, often seem out of date. Their very size defeats their purpose: contacts between workers become extremely difficult and the countless papers (of uneven quality) oblige the organisers to hold numerous sessions, many of them concurrently. For many senior members a congress is merely an opportunity for private conversation outside the lecture hall. The cost of the congress is high and hardly merited by the scientific results.

Congresses have nevertheless become so well established a tradition that it would be impossible, even if it were desirable, to abandon them altogether. It is more realistic to try to change their objectives and to harness their momentum for different purposes. The monster congress of today cannot have the same objectives as the small congresses of the early days. What can therefore be done?

(1) The teaching function of the congress must be deliberately emphasised and its programme drawn up accordingly. Large congresses have their usefulness in dispersing standard knowledge, techniques, and practices widely to all parts of the world. Certain congresses are already taking the form of large refresher courses. Such international congresses appeal to younger workers as well as to those who live in isolated communities.

(2) Congresses need not be held so often. Some are held every two years, but a periodicity of four or five years is probably more realistic, though of course each case must be judged on its merits.

(3) Some attempt must be made to limit the number of participants. It is hard to do that in an authoritative way by a deliberate decision, and the most suitable way seems to be to limit the subject matter. Certain congresses, by attempting to study several subjects or choosing a subject too broad in itself, achieve very little and often end in confusion.

(4) The necessity for coordination in time, place, and subject must be kept constantly in mind. There are today many international organisations covering every conceivable discipline. Poaching a subject on another organisation's territory leads to waste of time and energy. There have been unfortunate instances in the past when the same subject was studied simultaneously in widely separated cities.

(5) The opportunity of a congress should be used for the organisation of satellite meetings which can take the form of closed symposia, seminars, or training courses in laboratory methods. In particular, symposia should be organised quite separately from the congress—either before or after. They can draw part of their membership from the congress and make up for the congress's more restricted programme.

Two other types of meeting—the international conference and the seminar—have been studied by C.I.O.M.S.

The conference, as defined by C.I.O.M.S., is a meeting not exceeding 300 participants, all leading authorities carefully chosen by an international programme committee, and the purpose of the conference is to allow exchanges of information on a specified subject. What the conference may lose in breadth it may reasonably hope to gain in depth. It can be very much more technical in its approach than a congress and may attain a level somewhere between those of a symposium and a congress. A conference needs a more homogeneous composition and is a very satisfactory type of meeting to be held in association with an annual assembly.

The seminar is a teaching device and consists of up to 50 people meeting full-time for from one to four weeks. Of the

group, 10-15 have an instructional role and the rest are "students". The seminar proceeds by a combination of didactic instruction, small working groups, and discussions.

During the past three years, C.I.O.M.S. has done its utmost to promote these distinctive types of international gatherings by giving advice asked for by its member organisations, by publishing monographs, by keeping a register of congresses, by publishing calendars, and by convening "congress planning meetings". The Council has encouraged the organisation of symposia in relation to congresses and has arranged several on its own initiative. To help younger men to attend selected congresses, C.I.O.M.S. has granted a number of "congress fellowships". The Council has encouraged and occasionally undertaken the organisation of certain types of meetings in the so-called underdeveloped countries.

Although the Council's individual activities have been very successful, improvements have been slow to emerge from them. This is perhaps not surprising considering that international congresses are recurring events arranged by individual international societies or by people in the same tradition as the previous organisers. Each succeeding congress tends to draw its pattern from its predecessor. Although the secretariat of C.I.O.M.S. is in constant touch with the officers of its member organisations, all international societies, associations, or unions have not reached an identical level of efficiency. Between the highly active societies and those that are barely more than a list of names on a letterhead, there are many run on a part-time basis with insufficient secretarial help. Communication between international secretariats and national chapters is therefore often inadequate or irregular. Moreover, certain broad disciplines are covered by a number of overlapping international organisations with insufficient liaison. Indeed, some international societies have obviously outlived their usefulness, and C.I.O.M.S. is to give serious thought to a radical pruning so that the tree will gather fresh strength.

The policy of C.I.O.M.S. will be developed in the light of these considerations. The Council will strive to have its recommendations regarding meetings more widely accepted and will encourage a functional regrouping of international organisations in certain fields. The Council will also suggest to member organisations the study of certain questions, such as geographical pathology and controlled clinical trials. Help will be given, as in the past, to those organisations which will undertake work in documentation, bibliography, and terminology and nomenclature.

To create a body of opinion favourable to the Council's policy, C.I.O.M.S. intends to enlist the cooperation of the leading national medical institutions in each country. Contacts have existed with national academies, colleges, research centres, and prominent national societies, but formal relationships are needed. Accordingly, the articles of association of C.I.O.M.S. were amended to enable one national institution per State to become an associate member, and thus help to shape the Council's policy and programme.

At the close of its fourth general assembly, C.I.O.M.S. is in a better position to attain its objective. It does not seek to impose its views on its members but simply to advise, encourage, and coordinate. Voluntary organisations, if they can accept enough self-discipline to correct the faults which are the price of their independence, have an essential part to play in the scientific world of today.

In England Now

A Running Commentary by Peripatetic Correspondents

As I was dreaming up the Bakerloo to the R.S.M. the other evening a seductive notice caught my eye. "Advertise in this space," it said, "for less than 1*s.* a week." To me this was a new and original suggestion. To think that I could have a lump of my narcissistic ego travelling from the Elephant to Stanmore and back being stared at by millions of people. What would I put—"(ME) FOR CONSULTANT", obviously. The idea had other possibilities. How about sending someone a year's subscription by way of an original Christmas present? Or even better, leaving a space in perpetuity in a will to use as they thought fit. But science won in the end, and by the time the collector was poring over my shredded ticket I had worked out a new projective technique in succession to our old and invalid friend, the Rorschach.

The instructions for my test run:

A mad uncle has left you a space in an Underground train to advertise what you like for the rest of your life. What would you put?

A nice neat device, no elaborate equipment needed: now to validate it. The first thing to do was to give the test to a large and representative population and correlate the replies with something. My wife was ready to hand, and her answer was simple: "Good second-hand pram. wanted", and then "Daily woman to do the rough." That, I decided, was definitely diagnostic. Fred was in the commonroom reading *The Worker*, so I asked him. "Ban the H-Bomb," he thought, "or Underground Movements of the World Unite." One of my more sadistic colleagues suggested "This space is yours for only 3*d.* a week" to cause havoc in the inquiries department of London Transport.

My study continues, so Watch This Space for exciting new developments in applied psychology.

* * *

"A little bit of this and a little bit of that", then a brisk stir with his glass rod, an admiring glance at upraised arms-length, and the cheapjack handed down the half-filled glass. "Try it," he coaxed, his nose twitching with the strong scent of prey. "The greatest herbal medicine since the discovery of America and Peruvian bark." With his ingratiating manner and rolling eyes he was the counterpart of Chaucer's Pardoner. In fact, he quoted with a leer, "My theme is always one and ever was—Radix malorum est Cupiditas." This impressed us—here indeed was a man of letters.

I was pushed forward by the resilient ring of interested spectators. "Come sir, the flavour is unique, and the effect miraculous. The ingredients are purely from Mother Nature, untouched by human hand. Clears the catarrh, flushes the system, regulates the digestion—" Curiously watched, I sipped it with growing appreciation—"steadies the brain, sweetens the breath, sparkles the eyes"—Not at all bad until the chalky sediment settled on my tongue and yet I resisted adding "polishes your buttons" at the usual affront—"and makes your hair curl". Being stone bald I was grateful he didn't call me Curly.

Though diffident and dazed I acted the go-between—handing the small assorted bottles into the crowd and receiving a large silver coin in exchange. The policeman turned the corner—our stock was half sold—and as we hadn't got a hawker's licence we had to beat it. But isn't it a wonderful way to get rid of all those samples that lie on our shelves gathering dust?

* * *

Our nearby university city runs an ideal cinema where the films are good, the seats are bookable, and there are no advertisements. Last week we went with some trepidation to see Garbo in her 24-year-old film *Queen Christina*. And how worth while. After a little laughter at the old conventions of the cinema, all ages, from undergraduates onwards, were enveloped in her portrait of an intelligent woman giving her crown, her riches, her country, her everything, for love. A glorious piece of

escapism, an entrancing myth. We came home to coffee and the *Encyclopædia Britannica*. Someone looked up Queen Christina, and the myth was tarnished. The facts blew the cold wind of truth on to a brightly shining idea, and I suddenly realised I had had enough of facts.

For thirty years I have been taking in facts—familial, historical, political, economic, biological, medical. Everyone gives them away free—the newspapers, the radio, television, one's colleagues, the bus conductor. I have had enough. I learn from the newspapers that a film star has married for the fifth time, from the radio that 43·8% of the inhabitants of a Pacific isle are left-handed, from television that octopuses prefer crabs to lobsters, and from your journal that 10% of patients with gastric ulcers have hammer-toes. The concept of beauty in the female form has been reduced to three facts, glamorised as statistics. The important thing about the Cézanne painting is that it was sold for £220,000. Facts are now an end in themselves, and accumulation of facts passes for culture. In medicine the ability to produce facts is common, the ability to do anything with them rare. (Motto for 1959: synthesise or shut up.)

Those of my colleagues with their feet on the ground tell me that every medical article ever published has one new fact to give to the world, and that one day it will come in useful. So far as I am concerned, the rate of exchange at the moment is 10,000 facts to the idea.

* * *

The scene was in the labour ward when a new batch of students had arrived in the department. A tall masked and gowned figure stood at the head of the bed impassively as the second stage culminated in Sister turning the patient on her side. Taking a pair of scissors in her hand she looked up and said sharply "Well, don't just stand there—come and watch at *this* end!" An episiotomy allowed the baby to be born, whereupon the "student" exclaimed "Why darling we've got a daughter".

* * *

Man, as distinct from woman, can today be of good cheer. There is now incontrovertible evidence that the male is biologically the superior animal.[1] Dr. Gordon has shown that if an electric current is passed through a solution containing fresh sperm then the male sperm turns to the left (the cathode) and the female sperm to the right (the anode). Thus, it is proved beyond a peradventure that the seed of man is charged with positive electricity, while the seed of woman is charged with negative electricity. What could demonstrate more plainly than these results, which any competent mathematician could express as a differential equation, that strength flows from man with his positive ions to woman, weak with negative potential? Perhaps Orwell might have added to his pessimistic glimpse of the future an epicene landscape pockmarked with grotesque and leering spermometers linked with power cables busily separating the male and the female sperm of the world's fauna under the direction of a Minister of Sex. Significantly, the first observations of these electrolytic boys-to-the-left girls-to-the-right movements were by a woman biochemist working in Russia. They have been successfully repeated both in this country and in America.

In the history of man, methods of sex control are as old as agriculture. They tried it in ancient China. When the Pharaohs lorded it on the banks of the Nile it was well known that pregnant women with a greenish cast of countenance gave birth to males (combination of morning sickness and positive ions?). That wise old man Aristotle was not averse to taking a chance at sex control and gave out that if the marriage bed were placed in a north-south direction male heirs would be born to the happy couple. His 50% of successes has since been repeated by many of our venerable G.P.s wise in the ways of the world.

* * *

News from School.—I am getting on very well at school. I hope you are very well and not in bed ill. At school I have got 6 good stars and no bad stars and I have got 49 good pionts and only 2 bad pionts. I am very well to and not in bed ill. My sister is getting on very well at school she has got 5 good stars and no bad stars. No good pionts and 1 bad piont. I hope you are very well.

1. Gordon, M. J. *Sci. Amer.* November, 1958, p. 87.

Letters to the Editor

MEDICAL RESEARCH AND EMIGRATION

SIR,—Professor Peart's timely letter of Dec. 6 compels a little stock-taking. His figures omit totals and may thus create an impression rosier than reality. He was kind enough to quote some data from the Department of Medicine in this school relating to the years 1948 to 1956. In this period we had 58 British-trained registrars and senior house-officers who engaged in various ways in research activity. Only 18 are now in appointments in this country which permit continuation of research and teaching. 13 who have gone abroad (9 to the U.S.A.) are getting facilities and opportunities which could not be provided in this country. What is to be feared is that the 30% prospect of continuing in an academic career in this country will appear so difficult to these idealistic, devoted, and scientifically keen young doctors that a declining fraction of our talented professional youth will embark on a career with such limited outlets, and for which they get little enough credit when they try to switch to applications for provincial consultant work. This fear is very real when we hear that the Medical Research Council's clinical research training fellowships are not fully taken up. The university clinical units in most teaching hospitals are cramped in space, facilities, and numbers of career appointments. The Medical Research Council offers no real fixed permanency or security except to its unit directors. A handful of overloaded clinical professors cannot sustain research without senior whole-time colleagues, who ought to be on a nearly equal footing as regards pay and status. The Newcastle experiment of a shared university and hospital appointment, and shared university and M.R.C. payment (of which we have successful examples on the staff of this school), are ways of spreading thin finances. But in general there are not enough senior academic posts to absorb our best trainees, and it is well known that even professors and unit directors have departed across the Atlantic to escape frustration.

Clinical medicine never offered greater opportunities for the exercise of scientific talent and training than it does today, but few of our undergraduates spend the time needed to get science degrees, which they feel will be a waste of effort. All branches of medicine—cardiology, metabolism, endocrinology, gastroenterology, hæmatology, to mention only a few—are equipped with tools and techniques undreamed of even a decade ago. I am privileged to admire the enthusiasm, ingenuity, and deep critical knowledge of scores of keen young doctors, but equally saddened by our failure to provide the milieu for their full development. We probably have the best-educated youth in the world, and leadership in medical science would be within our hands if we were only given the financial strength to grasp it. Surely the most humane of all the sciences is not to be allowed to wilt for want of funds and lack of reasonable laboratory and other research facilities. A further expenditure on clinical research equal to 1% of our total health-service costs would change the whole situation. Such a development of medicine would be far cheaper than the advancement of, say, rocketry, and of much more direct appeal to some of our wavering friends.

Postgraduate Medical School,
London, W.12. J. MCMICHAEL.

GASTROINTESTINAL HÆMORRHAGE AND SALICYLATES

SIR,—The letters in your issue of Nov. 22 from Dr. Allibone and Dr. Flint, and Dr. Davis, rightly stressed the importance of the selection of a control group for the statistical study of salicylate consumption as a causative factor in massive gastrointestinal hæmorrhage. They suggest that patients admitted to hospital for acute surgical emergencies are more suitable for this purpose than the outpatients complaining of dyspepsia selected by us.

After careful consideration, we believed that hospital patients with acute abdominal emergencies (or with many other disorders) are unsuitable because pain from the primary complaint might lead to excessive salicylate consumption, whereas gastrointestinal hæmorrhage is a painless condition. Furthermore, the great majority of patients with hæmatemesis or melæna (regardless of prior salicylate ingestion) give a previous history of dyspepsia and this may well have conditioned their habitual salicylate consumption in view of recent medical and commerical comment. By taking outpatients complaining of dyspepsia as a control group, we attempted to comply with these two fundamental factors.

Moreover, it is felt that the incidence of aspirin consumption is significantly higher in the period 24 hours immediately prior to hæmorrhage. Thus, an analysis of aspirin habits over a period of a fortnight before the hæmorrhage may have been an additional factor in the disparity between their results and ours.

Our investigation was prompted by the uncertain validity of methods of comparison used in earlier studies, and we would certainly agree that ideal statistical control for this important problem has yet to be devised.

London Chest Hospital, London, E.2. A. S. ALVAREZ.

Mayo Clinic, Rochester, Minnesota. W. H. SUMMERSKILL.

ASSESSMENT OF PULMONARY FUNCTION

SIR,—When clinicians want to assess pulmonary function, the test that comes most readily to mind is the maximum voluntary ventilation (M.V.V.). This relatively simple test, either alone or with the vital capacity, may give much valuable information. But, because most of the apparatus used in respiratory physiology is cumbersome, expensive, and non-portable, the M.V.V. is rarely measured outside specialist and teaching hospitals.

In 1956 Warring and Siemsen [1] gave details of a new and accurate apparatus for measuring the M.V.V. Based on the Venturi principle, it is called the 'Ventube'.

The Venturi tube is a cylinder whose bore becomes progressively smaller from each end to the throat at its middle. The velocity of a fluid flowing through the tube is greater at the throat in accordance with Bernoulli's law, which states that $Q = AV$, where Q = quantity per unit of time, A = cross-sectional area of the stream, and V = average velocity. This principle is well known to physicists, who use it to measure the flow of gases and liquids. Since the M.V.V. is a volume of air breathed *per unit of time* (i.e., litres per min.), the Venturi principle may be used for its measurement.

The ventube (fig. 1a) is of metal alloy, 6 in. long, with an internal diameter at its ends of $^{36}/_{64}$ in. The throat is $1^{3}/_{4}$ in. long, and the internal diameter at this point is $^{26}/_{64}$ in. A side-arm enters the middle of the tube at right-angles; its internal diameter is 0·070 in. At the junction of the side-arm and tube, the diameter is 0·042 in.

1. Warring, F. C., Jr, Siemsen, J. K. Communication to the American Trudeau Society, 1956.

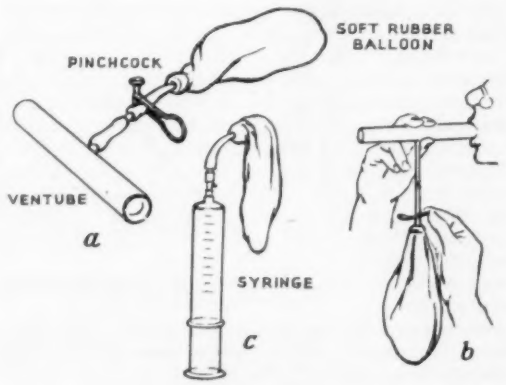

Fig. 1—The ventube.

On breathing in and out of the tube, a proportional volume of air is sucked into the tube via the side-arm. If a soft rubber balloon is inflated with a known quantity of air and then attached to the side-arm, the ventilation can be measured by calculating the volume of air extracted from it in a given time (fig. 1b). In practice the balloon is filled with a 100 c.cm. glass syringe, and it is emptied, using gravity to give an end-point, when the test is complete (fig. 1c). Subtraction gives the volume of air used during a given period.

The ventube is calibrated for the M.V.V. and also for exercise ventilation. Tables of the relevant values are provided, and their derivation is given in the original paper by Warring and Siemsen.[2]

The apparatus is delightfully simple and portable, and as there are no moving parts it is virtually foolproof. Patients do not find it suggestive of science fiction, which cannot always be said of the apparatus used in respiratory physiology.

It is cleaned and sterilised by immersion in 70% alcohol. 20 minutes' immersion is needed when tuberculous patients are being tested, but for routine work a 5-minute soak is adequate.

Before placing reliance on the ventube, I checked its performance by matching the readings with those of a spirometer. The M.V.V. was first measured on a Collins 13·5 litre spirometer with the soda-lime and valves removed to lessen resistance, and then on the same patient on the same day it was measured with the ventube. The results were:

Case no.	*Spirometer*	*Ventube*
1	92·4	91·5
2	18·6	21
3	154	153
4	108	115·5
5	32·5	30
6	·70	70
7	30	28·5
8	53·8	54·5
9	114	118·5
10	90	88·5

The close correlation between these two sets of figures is shown graphically in fig. 2.

In clinical practice, during the past year, I have used the ventube mainly for measuring the M.V.V., but sometimes a walking ventilation (W.V.) has also been estimated and the two values related, thus:

$$\frac{\text{W.V.}}{\text{M.V.V.}} \times 100 = \text{Dyspnœa index}$$

The ventube has proved an accurate means of assessing the progress of obstructive pulmonary diseases (bronchial asthma, emphysema, and chronic bronchitis), and the response to bronchodilator drugs, both at the bedside and in the outpatient department.

2. Warring, F. C., Jr., Siemsen, J. K. *Amer. Rev. Tuberc.* 1957, **75**, 303.

It has also been useful for "screening" patients before thoracic operations. By measuring the M.V.V. I have sometimes been able to foretell respiratory failure, and any patient whose ventilation was borderline was referred to a specialist hospital for more elaborate studies. In at least one case a diffusion defect was deduced from the ventilatory studies.

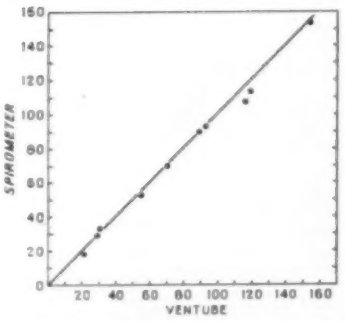

Fig. 2—Correlation between values for the M.V.V. (litres per min.) from spirometry and the ventube.

A man of 64, whose chest X-ray showed miliary mottling, had dyspnœa on exertion. Physical examination revealed cyanosis, finger-clubbing, and dry rales at both lung bases. The M.V.V. was 110 litres per min., which was normal. The walking ventilation, however, was grossly increased to 40·1 litres per min. and in doing this test he became greatly cyanosed. This was strongly suggestive of a diffusion defect, which was confirmed by lung biopsy showing chronic interstitial fibrosis. The diffusion capacity for carbon monoxide was greatly reduced, pointing to an alveolar capillary block.

I wish to thank the physicians at the Whittington Hospital, and in particular Dr. Michael Ashby, Dr. Peter Davies, and Dr. Arnold Bloom, on whose patients many of these estimations were made. I am indebted to Messrs. H. K. Lewis for permission to reproduce fig. 1 from my book, *Lung Function Tests*.

The London Hospital,
London, E.1.

B. H. BASS.

AN INBORN ERROR OF METABOLISM WITH URINARY EXCRETION OF HYDROXYACIDS, KETOACIDS, AND AMINOACIDS

SIR,—A number of workers have expressed interest in a report [1] of an infant with severe mental defect who excreted in the urine several abnormal acids including phenylpyruvic acid and a substance considered to be α-hydroxybutyric acid. This latter gave rise to a very unusual smell which should facilitate the recognition of any future cases. This smell is quite unlike that of phenylacetic acid which is familiarly associated with phenylketonuria. The urine has now been examined in the Courtauld Institute of Biochemistry, and by Dr. Marvin Armstrong of the Fels Institute, Yellow Springs, Ohio *; we would draw attention to the new findings and present a new theory which may help to clarify this condition and its relationship to other metabolic abnormalities in infancy.

The urine had been stored for over a year and frozen and thawed more than once, but it retained the characteristic smell. The phenylpyruvic acid, which had been repeatedly detected in fresh specimens, had, not unexpectedly, decomposed and was no longer detectable, but all the other previously reported findings have been confirmed.

In addition to the aminoacids previously detected in this urine (namely, a very high excretion of methionine and an increased excretion of phenylalanine and tyrosine) a greatly increased amount of leucine(s) was also present. By contrast, the other aminoacids which are normally to be found in small amounts in urine were scarcely detectable; of these, alanine in particular was virtually absent.

Since it is known that phenylketonurics excrete increased amounts of indolyllactic acid (I.L.A.) and indolylacetic acid (I.A.A.) in the urine,[2] the presence of these substances was sought in this case. A very high concentration of I.L.A. but a normal amount of I.A.A. were found.

For the same reasons, the urine was also examined for the presence of those phenolic acids known to be associated with phenylketonuria. Large amounts of *p*-hydroxyphenylacetic acid and *p*-hydroxyphenyllactic acid were present, but *o*-hydroxyphenylacetic acid could not be detected.

Dr. Armstrong has particularly emphasised the absence of *o*-hydroxyphenylacetic acid, which he and others [3] have regarded as just as characteristic of phenylketonuria as is phenylpyruvic acid itself. On the other hand, the urinary excretion of I.L.A. in our patient could be regarded as typical of phenylketonuria. Clearly there is some overlap here which is difficult to interpret within the classical demarcation zones, but which reveals the possibility of complex interrelationships between different biochemical disorders.

To complicate the situation still further, a mentally normal patient has been found who excretes a considerable quantity of I.L.A. but *no p*-hydroxyphenyllactic acid †; this patient also shows the massive aminoaciduria characteristic of Hartnup disease.[4] Another metabolic abnormality to be considered is "maple-syrup urine" disease.[5,6] Infants with this disease are mentally defective and they excrete urine with a smell not unlike that of our present case.

It is quite conceivable that the excretion of an abnormal metabolite may result from one of a number of different biochemical lesions, even when the possible lesions are unrelated to each other. In our case, the excretion of phenylpyruvic acid might be due, not to a block in the conversion of phenylalanine to tyrosine, but to a block in the utilisation of phenylpyruvic acid itself; the mental deficiency might still be due to the same lesion or deficiency as in phenylpyruvic oligophrenia, but this would have to be at some point metabolically removed from the primary lesion. An extension of the concept suggests a more general failure of ketoacid utilisation, and leads to rationalisation of some of the biochemical findings.

If our patient was unable to utilise the ketoacids derived from certain of the dietary aminoacids, notably from phenylalanine, tyrosine, leucine, and methionine, these ketoacids and/or their hydroxy equivalents and aminoacid precursors would accumulate. This would account for the urinary aminoacids, hydroxyacids, and phenylpyruvic acid on a quite different basis from that normally considered to act in phenylketonuria; furthermore, the absence of *o*-hydroxyphenyl derivatives would be explained.

A similar block in the utilisation of indolylpyruvic acid (from tryptophan) could be responsible for the accumulation and excretion of its reduction product, indolyllactic acid. The urinary α-hydroxybutyric acid would be due to a similar block in the utilisation of α-ketobutyric acid. Although this latter substance is not recognised as a metabolic intermediate, the corresponding aminoacid is a normal, though minor, plasma component. The concept can be extended to explain the incredibly low excretion of the usual urinary aminoacids (mainly the dietary-dispensable ones) through their compensatory over-utilisation to provide intermediates normally available from other aminoacids.

1. Smith, A. J., Strang, L. B. *Arch. Dis. Childh.* 1958, **33**, 109.
2. Armstrong, M. D., Robinson, K. S. *Arch. Biochem. Biophys.* 1954, **52**, 287.
3. Armstrong, M. D., Shaw, K. N. F., Robinson, K. S. *J. biol. Chem.* 1955, **213**, 797.
4. Baron, D. N., Dent, C. E., Harris, H., Hart, E. W., Jepson, J. B. *Lancet*, 1956, ii, 421.
5. Menkes, J. M., Hurst, P. L., Craig, J. M. *Pediatrics*, 1954, **14**, 462.
6. Westall, R. C., Dancis, J., Miller, S. *Amer. J. Dis. Child.* 1957, **94**, 571.

* We thank Dr. Marvin Armstrong for permission to refer to his findings.

† We thank Dr. H. Bickel (Marburg) for the opportunity to examine urine from this patient.

We agree with Dr. Armstrong that this condition is not just an additional rare facet of phenylketonuria, but a "new" syndrome. The distinction can be made on clinical and morbid anatomical grounds also.

We publish this preliminary report in the hope that a further case may come to light. The suggestions we have made about the primary biochemical lesion can then be tested, for example, by blood analyses for aminoacids, and by the investigation of tissues for their ability to metabolise appropriate ketoacids.

Courtauld Institute of Biochemistry, Middlesex Hospital, London, W.1.‡ JOHN B. JEPSON.
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Royal Victoria Infirmary, Newcastle upon Tyne.

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PROSTATECTOMY

SIR,—Mr. Ellis and Dr. Leatherdale (Dec. 6) have produced a most interesting paper on this subject, and it comes from a centre with very considerable experience of spinal and local analgesia. But I feel that they have not made the best use of the material they have gathered. 340 patients is a very respectable number to analyse but none of the differences between the "spinal" and the "general" series is statistically significant, except one. Surprisingly (perhaps) the one significant difference the figures show is that the prevalence of wound infection is lower in those patients receiving spinal-and-local analgesia. Some Russian authors have claimed that the infiltration of tissues with large volumes of dilute cinchocaine solution (a common method of analgesia in Russia, I understand) hastens healing in operation wounds. If these findings should be confirmed it will more than exonerate anæsthetists who meddle in the operation field from blame for wound infection. However, that is rather by the way. My main point is that, if Mr. Ellis and Dr. Leatherdale were to make their two groups more closely comparable by eliminating those earlier poor-risk cases who were selected for spinal-and-local, they might be able to show some definite advantages for one or other of their anæsthetic techniques.

Birmingham. J. C. AINLEY-WALKER.

LOCALISATION OF NEPHROTOXIC ANTIGENS

SIR,—Investigations of the localisation of nephrotoxic antibodies, admirably reviewed in your leading article of Dec. 6, have come to embrace the wider problem of establishing the distribution of antigenic elements throughout the whole of the vascular and supporting-tissue systems. Clearly evidence obtained from different technical approaches cannot yet be synthesised into a coherent picture, and further complexities are likely to be uncovered.

We should like to draw attention to a development of the work with fluorescein-labelled antibodies to normal organs or tissues to which you refer. The antiserum to renal glomeruli prepared by Cruickshank and Hill was found, as you say, to react not only with structures in the glomeruli, but also with reticulin and basement membranes throughout the body. More recent work by one of us [1] (D. G. S.) has made it clear that at least two distinct antigens, both present in glomeruli, are concerned in these reactions. One of these antigens is represented in reticulin in other organs, the other is associated in general with epithelial basement membranes. In capillaries only the reticulin antigen can be demonstrated, but the media of larger vessels contain material which reacts in the same way as epithelial basement membranes. It has not hitherto been possible to isolate either antigen in pure form and to test each one individually for "nephrotoxic antigenicity". Furthermore it is by no means certain that no more than two antigens exist in non-cellular supporting tissue.

Rheumatism Research Centre, Stoke Mandeville Hospital, Aylesbury. ALAN G. S. HILL
D. G. SCOTT.

1. Scott, D. G. *Brit. J. exp. Path.* 1957, **38**, 178.

CHLORAMPHENICOL AND CONTROL OF THE COMMON COLD

SIR,—I should like to describe our experience of treating the common cold and sore throat with chloramphenicol. This drug was chosen because sensitivity tests of throat swabs cultured on to blood-agar showed a superior ring reaction with chloramphenicol, and because in our experience drug resistance was rare. We have made two trials during the past four years.

In the first trial, 60 patients were given a total of 3·5 g. of chloramphenicol orally in a dosage of 250 mg. q.i.d. for the first two days, 250 mg. t.i.d. on the third day, 250 mg. b.i.d. on the fourth day, and a single dose of 250 mg. on the fifth day. Many of these patients were teachers or professional singers who were usually incapacitated by their symptoms. But on this regime 56 of them were able to carry on their routine work, and the other 4 had only slight fever which settled within one or two days. 40 control patients were given a placebo, and in 38 this did not prevent the progression of symptoms.

In the second trial we aimed at giving chloramphenicol by local application so as to reduce the total dosage. The palmitate was chosen because of the bitter taste of chloramphenicol itself, and was made up in the form of lozenges each containing 30 mg. of chloramphenicol palmitate (i.e., 15 mg. of chloramphenicol base). Unfortunately this preparation proved to be inactive in vitro, and our idea of local treatment had to be abandoned. Nevertheless we tried these chloramphenicol palmitate lozenges in 20 patients whose throat swabs showed sensitivity to chloramphenicol. In 16 the symptoms were effectively suppressed with a dosage of 10–14 lozenges daily for two to three days, and we assumed that this effect was not a local one, but was due to intestinal absorption of chloramphenicol. Hence it seems that even such small doses as 150–200 mg. of chloramphenicol per day, when administered continuously, can suppress the infection.

I believe with Ritchie [1] that the reactions of the common cold and sore throat are due to the patient's own pharyngeal bacterial flora, which becomes more virulent when the ground is prepared by viral invasion, and for this reason treatment with antibiotics is justified. Many people do not share this opinion because such an infection, when untreated, recovers in a few days' time. But this view takes no account of the risk of secondary diseases, and especially acute nephritis, nor of the loss of working time when the patient is incapacitated.

The "broad spectrum" cover provided by chloramphenicol makes it superior to the sulphonamides and to other antibiotics, particularly the tetracyclines, because it does not, in the dosage we suggest, induce vitamin depletion, moniliasis, or general depression. Moreover, there are almost no anaphylactic or allergic reactions, and few resistant bacterial strains.

We do not agree that, because of the risk of blood dyscrasias, chloramphenicol should only be used for typhoid fever and other serious infections. When criticisms of chloramphenicol were published, Parke,

1. Ritchie, J. M. *Lancet*, 1958, i, 618.

Davis & Company made it known in 1954 that at least eight million patients had then been treated with it. As a result Haviland (quoted by Brown [2]) calculated that the incidence of aplastic anæmia in the general population was greater than the incidence reported from chloramphenicol administration, which challenges the popular impression that the drug may cause a blood dyscrasia. Experience in Israel has fully justified this opinion.

I put these views before those who are reluctant to use chloramphenicol for so-called banal diseases because I feel there is no justification for restricting the use of this effective drug.

Department of Applied Pharmacology, Hebrew University—Hadassah Medical School, Jerusalem, Israel. F. G. SULMAN.

INTRA-ARTICULAR THERAPY IN RHEUMATOID ARTHRITIS

SIR,—Dr. Loxton's reply of Nov. 22, though splendidly furnished with adjectives, only shuffles the excuses without breaking fresh ground to justify his original criticisms. These are now whittled down to the complaint that we failed to quote the figures to which our statistical tests were applied. I can assure Dr. Loxton that only consideration of space frustrated their full publication.

Dr. Weiser (Nov. 29) suggests that careful physiotherapy and limitation of physical activity will prevent the deterioration we observed after intra-articular injections of hydrocortisone. This assumption may well be true but is irrelevant to the aim of our study, which was to emphasise the danger of uncritical reliance on a potentially damaging procedure.

Leeds. G. N. CHANDLER.

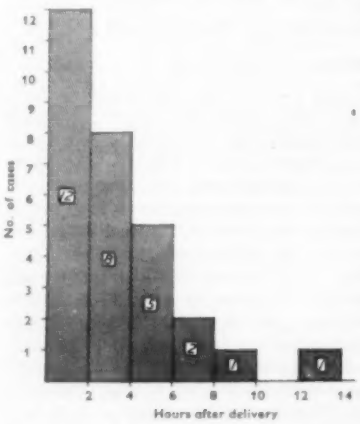
TOXÆMIA OF PREGNANCY

SIR,—In your issue of Dec. 6 Mr. Sophian again attacks clinical observations which do not tally with his views on the ætiology of pre-eclampsia. We still await, however, an acceptable statistical analysis to show that over-distension of the human uterus does, *by itself*, increase the incidence of pre-eclampsia. In a recent attempt to provide such evidence I reviewed 65 cases of anencephaly. Here is a condition in which over-distension of the uterus due to hydramnios is common yet the placental tissue is normal in quantity and quality. To complete the ideal set-up for the purpose of testing the myometrial-tension hypothesis, it occurs frequently in primigravidæ. 49 of the cases had gross hydramnios, and 24 were in primigravidæ; yet none had toxæmia according to the standards of Gemmell et al.[3]

In criticising my Blair-Bell lecture,[4] Mr. Sophian claims that the statistical controls are invalid in that they make no allowance for the proportion of primigravidæ and multigravidæ in the different groups. This is quite untrue. Proper allowance was made by a statistician for the proportion of parous patients in each group, and readers of the original article will find this stated.

I did not in fact deny that generalised œdema was of significance in toxæmia. Œdema without albuminuria or hypertension was not classified as toxæmia in the control series of Gemmell et al., and it was clearly essential to adopt the same standards in my study. There is nothing to suggest that, had such cases been included in both groups, the overall conclusions would have been any different. Nor is there anything to suggest that a 25% raising of the arbitrary level for hydramnios would have altered the picture. Again, the fact that the completely aberrant and disordered trophoblastic growth of chorion-epithelioma does not produce toxæmia is hardly relevant.

In refutation of a placental factor Mr. Sophian reintroduces the argument that eclampsia can occur post partum when the placenta has been expelled. In 92 cases of eclampsia which occurred between 1947 and 1957, the first fit occurred after delivery in 29 (32%). The majority of the fits began very shortly after delivery and the longest interval was fourteen hours (see accompanying figure). These findings are in accord with those of Page [5] and Hofmeister and Brown.[6] Arguments based on the onset of eclampsia forty-eight or more hours after delivery date from the time when all cases of puerperal convulsions or coma were labelled as "eclampsia". Nowadays, such causes of puerperal convulsions or coma as cerebral-sinus thrombosis, phæochromocytoma, epilepsy, and cerebral hæmorrhage can be differentiated, thanks to improved diagnostic techniques. It is very likely that placental substances can produce their maximal effect on the mother after the tumult of delivery, when the action of sedatives, given during labour, is wearing off.



Time between delivery and first fit in postpartum eclampsia.

It seems likely that advance in knowledge may, in time, split the cases at present arbitrarily labelled "pre-eclampsia" into different groups, though, even in the present state of our ignorance, Mr. Sophian refuses to countenance such an idea. The suggestion that all cases of diabetes have an identical hormonal background would not be accepted today, yet there is much to suggest that pre-eclampsia is, in similar fashion, a syndrome which may be the consequence of several different hormonal disorders.

It is pertinent to make clear that my aim was not to prove or to discredit any particular theory of pre-eclampsia. The aim was merely to derive as much factual information as possible from a study concerning the association of a raised incidence of maternal toxæmia with hydrops fœtalis—an association which has been obscured in recent years. My analysis of the facts made untenable the convenient explanation that excessive uterine distension was responsible but did point to a placental factor being involved in the cases studied.

As Prof. Norman Morris [7] remarked in your columns last year, Mr. Sophian's views often pass completely unchallenged, but that does not mean that they are generally accepted.

Liverpool. JAMES S. SCOTT.

2. Brown, E. A. *Ann. Allergy*, 1956, **14**, 206.
3. Gemmell, A. A., Logan, W. P. D., Benjamin, B. *J. Obstet. Gynaec., Brit. Emp.* 1954, **61**, 458.
4. Scott, J. S. *ibid.* 1958, **65**, 689.
5. Page, E. W. *Obstet. Gynec. Survey*, 1948, **3**, 615.
6. Hofmeister, F. J., Brown, R. C. *Amer. J. Obstet. Gynec.* **65**, 498.
7. Morris, N. *Lancet*, 1957, i, 790.

Parliament

QUESTION TIME

Local-authority Expenditure

Mr. ARTHUR BLENKINSOP asked the Minister of Health what additional local-authority expenditure on mental health and welfare services had been approved for 1959–60 and 1960–61.—Mr. RICHARD THOMPSON, parliamentary secretary to the Ministry, replied: Included in the figures of relevant expenditure taken into consideration in fixing the proposed totals of general grant for the first grant period are estimated amounts for these services of over £900,000 for 1959–60 and over £1¾ million for 1960–61 above the estimated figures for 1958–59. It is estimated that the rate of development for which these increases provide in each year is about two and a half times the annual development rate achieved in recent years. Mr. BLENKINSOP: As the Parliamentary Secretary knows, during the last few years there has been hardly any development at all. Why on earth should he try to confuse the House by talking about two and a half times the rate of increase when we all know that the rate of recent increase has been negligible?—Mr. THOMPSON: I cannot accept that what is now spent on these services is negligible, and I should have thought that a rate two and a half times greater is considerable by any standards.

Salaries and Beds

Mr. ROBINSON asked the Minister if he was aware that the practice of relating the salaries of nursing and other staff in mental hospitals to the number of occupied beds might penalise those hospitals pursuing a progressive policy of rehabilitation and discharge of patients; and if he would initiate steps to remove this anomaly.—Mr. WALKER-SMITH replied: Arrangements agreed by the Whitley Councils concerned provide some protection for existing staff whose salaries would otherwise be affected when there is a permanent reduction in the number of beds. While some anomalies may remain, it is difficult to find alternative arrangements which do not create further anomalies.—Mr. ROBINSON: Would not the Minister agree that one ought to try to encourage rather than to discourage mental hospitals to discharge patients? To what extent is there protection for the existing staff, and why cannot that protection be made permanent and complete?—Mr. WALKER-SMITH: I agree that it is good that patients should be discharged, subject always, of course, to the clinical facts. Safeguards are applied to protect the position of people already in the hospital employment, but in future appointments regard must be had to the new salary scales appropriate to the diminished responsibility which they carry.

Dr. EDITH SUMMERSKILL: Would not the Minister agree that, in the light of the new approach to mental disease, this method of remuneration surely places a premium on lack of initiative?—Mr. WALKER-SMITH: No, I do not think so. It is necessary to have some sort of index by which salary scales can be adjusted, and it is true in regard to future appointments that, if we happily have a smaller number of patients to take care of and fewer beds in hospitals, the task is likely to be less onerous to that extent.

Re-employment of Consultant

Mr. C. L. HALE asked the Minister what steps he had taken, since his letter to the Manchester Regional Hospital Board last July, to obtain suitable employment for Mr. A. H. Barber.—Mr. WALKER-SMITH replied: So far as I am aware, Mr. Barber has not applied to fill any consultant vacancy in the hospital service.—Mr. HALE: Does not the Minister think that is a somewhat contemptible answer in view of his assurance to the House in July that he had directed the board that it was under a moral obligation to offer this man employment? Is it actually a fact that no offer has been made to this very distinguished gynæcologist?—Mr. WALKER-SMITH: The Appointment of Specialists Regulations, 1950, require that consultant vacancies to the hospital service must be advertised, that an appointments advisory committee must be appointed to select from the applicants those who are suitable, and that a board may only select a person who has been so selected by the appointments committee. It follows that it is not possible to offer employment. The post must be advertised, application must be made, and then the moral obligation to which I referred comes into being.

Mr. HALE asked the Minister what replies he had obtained from the Manchester Regional Hospital Board to his request, made in July last, that it should accept a moral obligation to assist Mr. Barber to obtain suitable employment.—Mr. WALKER-SMITH replied: The board has agreed to my suggestion.

Mr. HALE: Is it not a fact that the board first adjourned consideration of his letter from time to time and as long as it could? Is it not a fact that the Minister knows the Manchester Regional Hospital Board made it constantly clear that it had not the slightest intention of lifting a finger to secure the reinstatement of this gynæcologist because it is still activated by the venom which made it contest the action?—Mr. WALKER-SMITH: The board in answer to my letter has accepted the moral obligation in this sense, that if the appointments advisory committee finds Mr. Barber equally suitable with any other applicants, then the circumstances must weigh the moral obligation in his favour. That is the most the board can do, and that it has said it will do.

Capital Expenditure of Regional Boards

The additional allocations for capital works to regional hospital boards from the extra £1,750,000 for capital expenditure before March 31, 1959, are as follows:

	£
Newcastle	105,000
Leeds	121,000
Sheffield	138,000
East Anglian	30,000
N.W. Metropolitan	125,000
N.E. Metropolitan	71,000
S.E. Metropolitan	110,000
S.W. Metropolitan	225,000
Oxford	55,000
South Western	140,000
Birmingham	66,000
Manchester	104,000
Liverpool	107,000
Wales	100,000
(Teaching hospitals	217,000)

Attempted Suicide

Mr. GEORGE JEGER asked the Home Secretary whether he was aware that a girl aged 17 years was sentenced to 3 months' imprisonment on Dec. 2 for attempting to commit suicide; and whether he would ensure that she receives any necessary treatment while in prison.—Mr. DAVID RENTON replied: The senior medical officer of Holloway prison considers that she is mentally ill and is taking steps to see that she gets proper treatment.—Mr. JEGER: Would the Under-Secretary agree that a child of 17 who attempts to commit suicide is far more in need of care and attention than of a prison sentence? Would it not be better if she were removed to a proper place where she could receive that care and attention rather than be in prison surroundings?—Mr. RENTON: This girl has attempted to commit suicide on four occasions. The case has a rather long history: it is an interesting example of how criminal proceedings and even prison sentences can ensure that a person who attempts to commit suicide gets the treatment which he or she needs.

Mr. KENNETH ROBINSON asked the Home Secretary if he was now in a position to announce the Government's intentions with regard to the law relating to suicide and attempted suicide.—Mr. R. A. BUTLER replied: I am in consultation with the Minister of Health and the Secretary of State for Scotland. I have already sought the views of the British Medical Association and the Magistrates' Association. A discussion is going on within the Government and with outside bodies as to the best course to adopt and, until I have concluded that, I would rather not reach a decision.

Compensation Paid by N.H.S.

The total amounts paid in compensation of all kinds by hospital authorities and executive councils in England and Wales, whether or not legal action was involved, are as follows:

	£		£
1949–50	23,636	1954–55	91,535
1950–51	38,556	1955–56	110,321
1951–52	106,574	1956–57	116,136
1952–53	152,590	1957–58	100,826
1953–54	159,047		

Leucotomy

In 1949, 1442 leucotomy operations were performed in National Health Service hospitals in England and Wales. In 1957 a special inquiry showed that 728 operations were performed in regional hospitals with 100 or more beds.

Discharged Mental Defectives

1957 of these patients have been discharged since the recent review; 3078 are still detained because they are unfit for discharge or have nowhere suitable to go.

Hospital Waiting-lists

At the end of June, 1958, there were 442,000 names on the waiting-lists of N.H.S. hospitals in England and Wales.

Conditions in Prisons

On Dec. 2, 1958, the prison population totalled 22,270, of whom 1606, or 7·2%, were classified as untried prisoners. On Nov. 18, 1958, there were 5925 men sleeping three in a cell out of a total prison population of 21,448 men.

The current cost of food at Dartmoor is 12*s.* 2*d.* a head a week, of which 1*s.* is spent on fresh meat. The dietary includes 14·7 oz. of fresh meat, 2 oz. of preserved meat, 8 oz. sausage meat, 5 oz. bacon, and 1 lb. fish.

Myxomatosis

Myxomatosis is reported still to be killing rabbits in 40 counties in England and Wales, but less virulent strains have appeared in about half of these counties. In some parts of the country the proportion of rabbits examined which show immunity is so far not more than 20%, but in other parts the proportion is as high as 80%. The scientific officers of the Ministry of Agriculture are of the opinion that the proportion of affected rabbits recovering from the disease will increase and that therefore the effect of myxomatosis will progressively diminish.

Public Health

Smog in South-east Lancashire

THE recent smog in the north-west of England lasted from Nov. 24 to Nov. 30, then returned on Dec. 2 and stayed until Dec. 6. It often cleared partially at midday and was never quite as dense as some of the well-known earlier smogs. The smoke and sulphur dioxide and trioxide varied from two to five times the November average, but never reached the peak of the November, 1956, smog. The peak this year came in one area on Nov. 29 when the smoke content was 302·5 mg. per 100 c.m. and the sulphur content was 0·7 parts per million; the average for November days without smog is smoke 65 mg. per 100 c.m. and total sulphurous content 0·15 p.p.m. Meteorologically it was not a dense fog and it had an unusual patchiness.

The social indices of the effect of this smog were remarkably consistent. Family doctors were not abnormally busy, but much minor illness (pharyngitis, "trivial" coughs and colds, sinusitis) affected the community. Most chemists reported, like the doctors, that they were some 20% busier. In Salford the total deaths for October and November (111 and 175 respectively) were lower than for the corresponding months in 1956 (126 and 171) (in 1956 the death-rate was raised by Asian influenza). The demand for beds at the bed bureau during the smog period was also less than in previous years. Big industrial firms reported little absenteeism.

Danger in Grain Silos

THE Ministry of Agriculture, Fisheries, and Food has reminded farmers of the serious danger to anyone entering a grain bin or silo when the grain is being run out of the bottom of the bin. When a bin is being emptied in this way, a vortex is created and anyone on the grain is liable to be drawn down and suffocated. Two fatal accidents have recently occurred in this way.

Obituary

JOHN DOBSON WARDALE

M.A., M.B. Durh.

Mr. J. D. Wardale, emeritus professor of ophthalmology in the University of Durham and honorary consulting surgeon to the Royal Victoria Infirmary, Newcastle upon Tyne, died at his home near Haydon Bridge on Dec. 7 at the age of 90.

He was born in Gateshead, where his father, who had been an engineer-draughtsman with Robert Stephenson, had started a business on his own account. He was educated at Aston Grammar School, Market Rasen, Lincs, and later at Durham University College of Medicine, where he qualified in 1891. After holding house-appointments at Newcastle and Bridgwater he became registrar to Mr. G. E. Williamson, who combined general surgery with an eye department at the Royal Infirmary in Newcastle. After Mr. Wardale started in general practice in Newcastle he continued to assist Mr. Williamson with his eye outpatients, and on Mr. Williamson's death in 1900 he was appointed ophthalmic surgeon to the old Newcastle Infirmary on the Forth banks. When the Infirmary was moved to its present site on Castle Leazes, he was given ophthalmic beds as well as an outpatient department.

From the time of his appointment to the Infirmary, he lectured in ophthalmology in the College of Medicine, and later he was appointed professor of ophthalmology in the University of Durham—one of the first chairs in the subject in the country. He retired from the Infirmary in 1928, and from his chair in 1933, but he continued for some time in private practice. On his retirement from the Infirmary he was appointed director of surgery at the Durham County and Sunderland Eye Infirmary. He was a founder member of the Oxford Ophthalmological Congress in 1908, and for many years attended its meetings regularly. He was a president of the North of England Ophthalmological Society.

J. S. A. writes:

"Mr. Wardale was a sound practical clinician, whose opinion was sought and valued by his colleagues. He was one of the earliest to recognise that changes in the fundus in hypertensive retinopathy were reversible. He always kept careful notes, which he had bound in volumes, forming a permanent record of his patients. His advice and opinion were in great demand in ophthalmological cases arising out of industrial employment. He often appeared in county courts in the north-east region, and the local county judges gave great weight to his opinion. His evidence was always given with conciseness and absolute impartiality, and opposing barristers seldom wasted the time of the court in cross-examination.

"As a student he was keen on football, playing association for his university, and for Newcastle West End—a forerunner of the present Newcastle United. On going to Bridgwater, he turned to rugby, and played as wing three-quarter for Bridgwater. In later life, his chief recreation was shooting, and he enjoyed country life generally. He had a wide circle of friends, both inside and outside the profession."

Mr. Wardale leaves a son and two daughters.

Notes and News

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE

AT a meeting of this society on Dec. 11, Prof. P. C. C. Garnham and Dr. D. K. Lewis described parasites of British Honduras, with special reference to leishmaniasis. They had gone to Honduras at the suggestion of the Director of Medical Services to investigate the reported increasing incidence of cutaneous leishmaniasis. The principal sufferers were the chicleros or chewing-gum collectors. Chewing-gum apparently used to be made exclusively, and is still made partially, from latex gathered by bleeding the bark of the numerous sapodilla trees in the forests of British Honduras. The chicleros live and work in groups of three or four; they enter the forests at the start of the rainy season, live a nomadic life moving from one camp to another, and emerge from the forests after six months or more when the rains are over. They proved elusive subjects, but Professor Garnham and Dr. Lewis, proceeding through the forest on horseback, eventually discovered one of their camps near the forest-choked Maya ruins at Caracol. Further pursuit of small groups of chicleros fortunately proved to be unnecessary; for with the onset of the dry weather they began to emerge from the forests, to convert their chicle into cash, and their cash into liquor. The " best haul of active cases was obtained by visiting such an establishment at Benque, on the Guatemala border, where we found several, one midnight, listening and dancing to a marimba band ".

Cutaneous leishmaniasis in this part of the world is largely confined to the ear and is known as chicleros' ulcer or bay sore (a term derived from the title " baymen " used for people living around the Bay of Honduras since the time of the original log-wood cutters in the reign of Elizabeth I). The ulcers can be very chronic, some lasting over 30 years, when there is destruction of the outer ear by granulomas alternately healing and ulcerating. Leishman-Donovan bodies are almost impossible to find except in relatively early lesions.

An animal reservoir for the parasite is probable, for the chicleros are so sparsely distributed in the forest and stay so short a time in one spot that the vector, phlebotomus, would have little time or opportunity to acquire the infection from one person and to pass it on to another a few weeks later. A search was therefore made for parasites in various animals, including armadillos, the " protective armour " of which made cardiac puncture a difficult operation. In British Honduras, 14 species of phlebotomus were found, including *P. cruciatus* Coquillett, which is believed to transmit cutaneous leishmaniasis in Mexico, but no leptomonads were found in the dissected flies. It was concluded that the most satisfactory control measure was likely to be the use of an attenuated vaccine.

Onchocerciasis, although it does not occur in British Honduras, is found in neighbouring Guatemala, and possible vectors were therefore investigated. 13 species of simulium were studied of which 2, *S. qyadrivittatum* Loew and *S. metallicum* Bellardi, attack man in large numbers.

In the discussion Dr. C. A. Hoare contrasted the multiplicity of clinical manifestations of leishmaniasis with the uniformity of the causative organism. He thought that throughout the world cutaneous leishmaniasis was caused by *Leishmania tropica* but the differing clinical states of espundia, uta, and chicleros' ulcer might be caused by subspecies.

Prof. A. W. Woodruff referred to the chronicity of chicleros' ulcer and to the related problem of latency in both cutaneous and visceral leishmaniasis. He described cases in which the parasites had apparently lain dormant for years before declaring their presence in a clinically recognisable form. In one case hypogammaglobulinæmia had been observed at the time the disease became apparent, and this introduced the possibility that factors influencing plasma-gammaglobulin levels might determine the onset of clinically apparent disease in long-standing latent infection.

Prof. H. S. Shortt suggested that species of phlebotomus flies, dwelling only in the treetops, might account for the special vulnerability of chicleros to the local variety of cutaneous leishmaniasis; and Dr. C. C. Chesterman considered that the curious localisation of the chicleros' ulcers at the tips of the ears might result from an optimal temperature for growth of the parasite, slightly lower than body-temperature.

THE KING'S FUND

The DUKE OF GLOUCESTER, presiding at a meeting of the general council of King Edward's Hospital Fund for London at St. James's Palace on Dec. 9, said that one of the great problems of the day was to provide adequate care for the elderly. The Fund had given thirteen homes in all, with a total bed complement of over 400, in order that elderly people might leave hospital and still receive some care and further rehabilitation. The Hospital Personal Aid Service, maintained by the Fund, had tackled in various hospital groups the problem of the long waiting-lists for geriatric units, and had been able to give much assistance in the admittance of the most serious cases, while help in various forms had been given to those who could remain at home temporarily or permanently. The Fund had just made a grant of £25,000 towards a day hospital in the grounds of St. Luke's Hospital, Chelsea, which, it was hoped, would not only contribute towards the wellbeing of the elderly in that area but also free hospital beds for those who needed them most urgently. A day hospital with a somewhat different purpose was being planned at St. Clement's, Bow. Old people with some degree of mental illness would be able to receive treatment there instead of being sent away to a remote mental hospital. The Fund was proposing to offer a grant of £50,000 towards the cost of rehabilitating a derelict block at St. Clement's, to provide a geriatric day hospital and treatment centre on two floors, with two 12-bed wards above for more severely disturbed patients, and some accommodation for staff.

Sir Henry Tidy reviewed the Fund's work for convalescent homes since 1946. At that time there was constant demand for beds for children, but very soon the health of the children began to improve and by 1951 the demand had fallen off and more beds were available than needed. Formerly very few convalescent homes would accept patients with any form of heart-disease, but now these could be accepted. Also, surgeons now sent their patients away to convalesce at a much earlier stage after operation. For these reasons there was now a large demand for rooms on the ground floor and for lifts.

University of Cambridge

Dr. J. H. Cullen has been appointed senior assistant in research in medical psychology and Dr. Cicily Clarke assistant in research in medical psychology.

University of London

Dr. A. C. Dornhorst, reader in medicine at St. Thomas's Hospital Medical School, has been appointed to the chair of medicine at St. George's Hospital Medical School.

Dr. Dornhorst, who is 43 years of age, qualified in 1937 from St. Thomas's Hospital. While holding house-appointments there during the next two years, he took the M.R.C.P. and the M.D. Lond. After spending some time as a clinical observer in the Medical Research Council's blood-transfusion research team, he joined the R.A.M.C. in 1940 and served as a medical specialist, reaching the rank of lieut.-colonel. After he was demobilised in 1946 he worked at St. Thomas's under the ex-Service scheme and in 1947 he was appointed senior assistant in the medical unit. He took up his present appointment in 1949. He was elected F.R.C.P. in 1955. His published work includes papers on the physiology of circulation and respiration.

University of Manchester

At recent examinations the following were successful:

M.B., Ch.B.—W. D. Ashworth, Alfred Aspinall, A. S. Buttoo, D. B. Case, W. G. Cautley, Freda M. Crossley, R. P. Davies, A. J. Ellison, P. J. Falconer, R. S. Goldberg, W. M. Gould, Ronald Greenbaum, Evelyn W. S. Harris, G. G. Hay, Kenneth Haywood, D. S. Hopton, D. N. Hutchinson, J. K. Johnson, P. M. Keane, Rowland Lansdell, D. A. Leighton, P. M. Lenten, Freda M. Lord, David Morrison, Joyce Newton, J. R. Norris, Harold Pomfret, H. S. Radden, J. N. Roskilly, R. J. Roycroft, Edward Shaoul, H. J. Shapiro, D. A. Thomas, Jack Thompson, J. D. Wilson, P. R. Wood, Ann C. Wright.

University of Liverpool

On Dec. 10, Prof. Brian Maegraith, dean of the School of Tropical Medicine and Hygiene, presented the Mary Kingsley medal to Prof. R. M. Gordon, who retired from the staff last September.

University of Edinburgh

Lewis Cameron Postgraduate prize (£45).—This prize may be awarded in July, 1959, to an M.B. of not more than 5 years' standing for the best paper describing original work on the diagnosis of disease. Papers should be lodged with the dean of the faculty of medicine, University, Edinburgh, 8, by April 6.

University of Dublin

On Dec. 11 the following degrees and licences were conferred:

M.B., B.Ch., B.A.O.—A. K. P. Bermingham, Elizabeth M. Bowden, Janet I. Byard, J. H. Chester, Heather G. M. Clarke, Monica M. Cronin, P. R. C. Dowse, Ruby S. Indar, Dolores King, F. G. H. Knight, D. R. Mandry, W. L. B. Miller, C. Gysbert van Reenen Mostert, Cicely E. Newman, J. M. O'Brien, Gerdina Bouwiena Oosterhuis, R. D. Taylor, D. A. W. Williams, D. Chee Peng Yeo.

L.M., L.Ch., L.A.O.—M. A. Lewis.

Royal College of Surgeons of England

At a meeting of the council on Dec. 11, with Sir James Paterson Ross, the president, in the chair, Lord Cohen of Birkenhead was appointed the first Watson-Jones lecturer.

The following lecturers for 1959 were also appointed: Mr. A. Dickson Wright (Bradshaw), Prof. R. N. Bradlaw (Menzies Campbell), Prof. Englebert Dunphy (Moynihan)

An endowment of £150,000 for the chair of pharmacology from Mr. G. A. Vandervell was accepted.

Diplomas of fellowship were granted to the following:

D. A. Dawson, J. G. B. Myles, O. O. F. Ffooks, Joselen Ransome, M. J. Ball, K. M. Bryant, Barry Altman, N. E. Shaw, M. S. Robertson, J. C. Smith, F. E. Loeffler, J. W. Wilson, Maddimsetti Venkataswami Naidu, E. G. Hardy, Augustus Appadorai Asirvatham, M. S. Beare, Prosunendra Mohan Chandhuri, Merlyn Kumarasinhe, Bijay Chandra Mukerjee, W. J. Oram, Sumitra Sen, Suiit Kumar Das, Deva Nandan Prasad Yadava, D. G. Bonham, Julian Ranjithan Chanmugam, G. H. Dunstone, Dadi Kekhushru Kabraji, John Mander, Samuel Jayam Seevaratnam, B. C. M. Chester, J. H. Neame, Bipinchandra Ranchoddas Parekh, Feroz Shah, Pravinchandra Amrital Shah, P. R. Casson, Devinder Singh Gill, D. J. Grimsdell, E. D. Morris, J. R. Pearson, L. J. Pigott, Mahmoud Kamel Youssef, W. L. H. Armstrong, George Birbara, Ivan Cher, H. W. M. Collymore, Michael Hobsley, Hussein Kamel Ismail, G. R. W. Latham, R. J. Ryall, G. F. Walker, Chinmoy Banerjee, E. G. Bennet, D. O. Hancock, R. L. Huckstep, Vimla Bhogilal Jhaveri, Nazimhusain Mohsinbhoy Lalljee, D. G. Macleish, Balakrishnapillai Thanuvan Nayar, W. S. E. Perera, P. F. Plumley, A. J. Rollo, J. G. Sallis, Parmanand Sharma, W. C. Shirer, H. G. Watts, E. C. Wood. C. I. Woolf, Sundaram Vivek Anand, Shirish Kanchanlal Bhansali, D. B, Bower, J. L. Castle, V. J. L. Cullum, Hamdy Mahmoud El-Sayed, Hymie Green, V. C. James, J. L. Jardine, Tilak Raj Kapur, D. M. Llewelyn, P. F. Lynch, Arnold Mann, Sorab Jal Mehta, J. D. H. Muir, Mahadevan Srinivasan, Samih Yousif Taktak, Harold Thomas, Abubakar Mohammad Alimumal, M. W. Brown, J. K. A. Clezy, Manohar Janardan Joshi, R. E. Kemp, Amritlal Rambhai Patel, M. E. Shackleton, Omar Hassan Shaheen, Laxmikant Naranji Vora, Katharine M. Burkill, J. S. T. Cox, Frederick Ehrlich, Sambamurthy Subramanian, John Vinnicombe, Balbir Krishan Vohra.

Royal College of Physicians of Ireland

At a meeting of the college on Dec. 5, with Dr. P. T. O'Farrell, the president, in the chair, Dr. J. J. Cockburn was admitted licentiate and member. The following were admitted licentiates in medicine and midwifery:

Yusuf Mansur Ali, R. G. R. Bobart, R. J. Christmas, Margaret M. Day, Kassim Ahmed Docrat, Noreen M. Duffy, Mearl A. Fenwick, M. N. Fitzgibbon, Herbert Holmes, Sumanth Narain Jeawon, O. C. Parry-Jones, H. A. Marcelin, Louisa E. Moran, Muhammed Abdul Qader Muhairez, Joseph McAleer, J. F. McCusker, Ryszard Hubert Narozny, J. Chukwudike Okoye, P. R. Panniker, Janina Pisko-Dubienski, D. L. Scawn, Mohamed Essop Seedat, Yashwant Zaverchand Shah, A. L. Tawiah.

Royal College of Surgeons of Edinburgh

On Dec. 10 the fellowship without examination was awarded to Prof. G. J. Romanes. The following were admitted to the fellowship:

Barclay Chivas Abernethy, R. T. Aldridge, Bushra Azer-Fam, G. W. Burgess, Ivan Cher, Anjaparavnda Biddayya Chinnappa, T. B. Comins, K. S. Davies, K. J. Dennis, Asit Kumar Deshmukh, M. J. Flood, R. L. Gadd, Devinder Singh Gill, A. G. Graham, J. M. Gray, Hymie Green, W. A. Hanna, J. A. Hunt, V. C. James, Kokengada Monnappa Kalappa, D. M. King, Phyllis A. H. Knocker, S. G. Leitch, D. B. Longmore, C. R. Lulham, D. H. McClymont, Adi Eruch Mody, P. J. B. Murray, J. R. Pearson, W. S. E. Perera, Iftikhar Husain Rathor, Mohamed Raza Rayman, C. J. C. Renton, F. O. Stephens, R. D. Stride, Narendra Swarup, Kumud Purushottam Tamaskar, H. J. S. Waldeck, G. F. Walker, Rajinder Kumar Wats, R. W. Weinberg.

Royal College of Physicians of Edinburgh

The office-bearers of the college for the coming year are:

President, Dr. A. Rae Gilchrist; vice-president, Dr. J. D. S. Cameron; members of council, Dr. I. G. W. Hill, Dr. J. G. M. Hamilton, Dr. J. Halliday Croom, Dr. T. Anderson, Dr. J. Laurie; treasurer, Dr. J. Alastair Bruce; secretary and registrar, Dr. R. F. Robertson; hon. librarian, Dr. John Ritchie.

British Association of Otolaryngologists

The following have been elected officers of this association for 1958–59:

President, Mr. C. Gill-Carey; immediate past president, Mr. I. Simson Hall; vice-president, Mr. R. R. Simpson; hon. treasurer, Mr. J. C. Hogg; hon. secretary, Mr. Myles L. Formby.

British Association of Plastic Surgeons

The following officers have been elected for 1959:

President, Mr. Rainsford Mowlem; immediate past president, Mr. J. S. Tough; hon. treasurer, Mr. R. P. Osborne; hon. editor, Mr. A. B. Wallace; members of council, Mr. T. Gibson, Mr. P. H. Jayes, Prof. T. Pomfret Kilner, Air Commodore G. H. Morley, Mr. E. W. Peet, Mr. Mortimer Shaw, Dr. Stuart Gordon (overseas representative); hon. secretary, Mr. C. R. McLaughlin.

Empire Rheumatism Council

The Council has awarded the following fellowships:

A research fellowship to Dr. J. Thomas (Low Temperature Research Station, Cambridge); a Geigy travelling fellowship to Dr. Evelyn Hess (Royal Free Hospital); a Wyeth fellowship in pharmacology to Dr. V. Moses (King's College Hospital Medical School).

International Congress of Pædiatrics

This congress will be held in Montreal from July 19 to 25. Further particulars may be had from the hon. secretary of the British Pædiatric Association, c/o Institute of Child Health, Great Ormond Street, London, W.C.1.

Chemists' Federation

At a special meeting on Dec. 12 it was resolved to dissolve the Federation on Dec. 31. In October the Court of Restrictive Practices found that restrictions imposed by the Federation, designed to confine the distribution of medical preparations to chemists' shops, were "contrary to the public interest" (*Lancet*, Nov. 22, 1958, p. 1117).

Mr. B. W. Rycroft has been elected an honorary member of the New Zealand, Australian, and South African ophthalmological societies.

Help for the Handicapped.—A booklet under this title discusses the place of voluntary service in work for the handicapped. It has been compiled by Dr. J. H. Nicholson, formerly vice-chancellor of the University of Hull, who has been helped by an advisory committee which included members appointed by the Central Council for the Care of Cripples and the National Council of Social Service. Copies (7*s.* 6*d.*) may be had from the National Council (26, Bedford Square, London, W.C.1).

Appointments

ASHURST, HAZEL M., M.B. Manc., D.C.H.: M.O., school health service, Manchester.

BATTEN, J. C., M.D. Lond., M.R.C.P.: part-time assistant physician (consultant), Brompton Hospital, London.

EMERSON, P. A., M.D. Cantab., M.R.C.P.: consultant physician, chest clinic, Westminster Hospital teaching group, London.

PEREIRA, P. F. A., M.B. Madras, D.P.H.: assistant divisional M.O., Bolton area.

Births, Marriages, and Deaths

BIRTHS

BRENNAN.—On Dec. 1, in the Christian Medical College Hospital, Ludhiana, to Joyce Brennan, M.B., wife of John Brennan, M.D.—a daughter Jennifer Anne.

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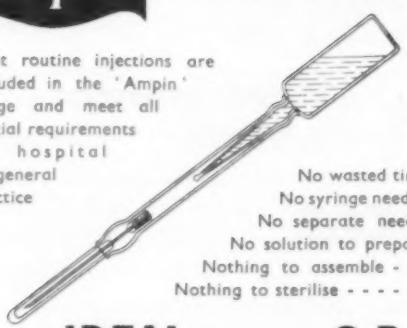

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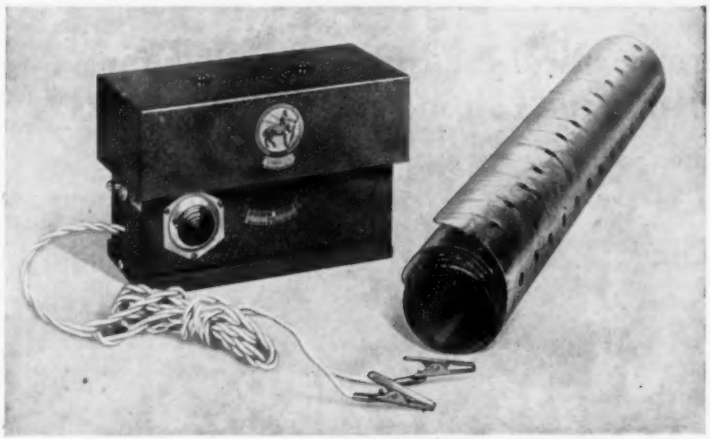

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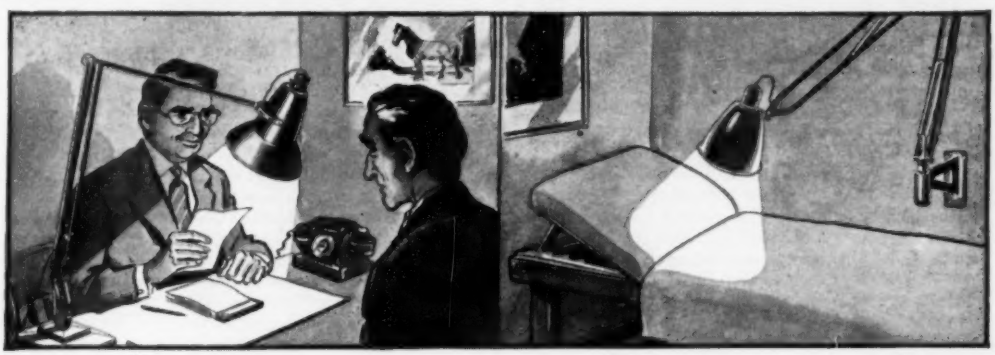

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VITAMINS LIMITED ANNUAL GENERAL REPORT

"Pharmaceutical Industry responsible for only 1/10½d in the £ of increased N.H.S. costs"

AT THE Annual General Meeting of Vitamins Ltd., held recently in London, Mr. H. C. H. Graves, Chairman, said that net profit for the year, after providing for pension and tax allocations, was up from £90,409 to £146,161. Ordinary dividend was increased from 17½% to 20%.

Mr. Graves said in 1955 he had stated that the Company had shots in the locker with fuses timed to go off in 1957, 1958 and even later. This was still true.

The most important project they had in hand appeared, at the moment, to be assured of a market and the question was the production of "pay" quantities quickly. If this could be done the project could be largely self-financing, but they were often hampered by what seemed to be inordinate time lags in the delivery of machinery.

Competition in their established lines continued severe and while they had the technical resources to meet and to excel all competition on grounds of quality and, he hoped, of price, it would require the most determined efforts of their hard-working and devoted staff, to maintain and improve the striking position gained over the past few years. They hoped to do it and to make further progress.

A month or so ago said Mr. Graves, the Ministry of Health's Annual Report for 1957 had shown an increase of £50 million in N.H.S. costs in one year, or £301 million increase since 1948. What were these increases mainly due to? It was safe to say that if this question were asked as a general knowledge test 99 per cent. of the general public and many leaders of opinion would give the wrong answer.

The correct answer was that £202 millions were due to increases in hospital costs (for salaries, fuel, provisions, bedding, etc.). Only £28 million of the nine-year increase went to drug manufacturers for drugs which—among other things—had saved the lives of several millions of people in this country alone since the N.H.S. started.

To put the matter in another way, of every £ of increased costs, the drug manufacturer had had 1/10½d. In their eagerness to assail him for the 1/10½d. (for which he had given amazing value in life-saving drugs as in many other ways) the critics forgot the other 18/1½d.

The role of the Company's product, Bemax, as the best-known vitamin-mineral-protein food in the world, continued to be appreciated and understood by doctors and dietitians, by nurses and mothers as it had been for the past thirty years. If, like some regimes, Bemax were unpleasant and not easy of acceptance, he could understand there being abstainers from its use. On the contrary, Bemax with milk or fruit juice, in soup or sprinkled on cereal foods was so delicious and added such zest to life that he really found it incredible that anyone who had the opportunity should fail to give it a trial, and still more incredible to think anyone, these days, could be found to deny their children its benefits and the protection which it afforded. The report and accounts were adopted.

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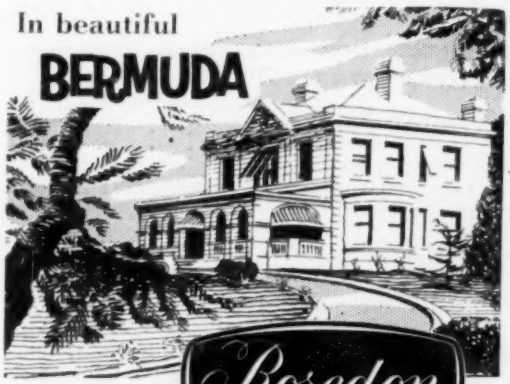

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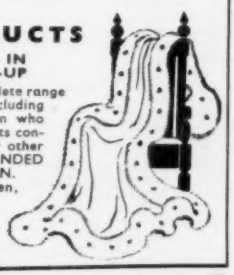

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Academic and Educational

INSTITUTE OF ORTHOPÆDICS

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL,
234, Great Portland-street, London, W.1

PROVISIONAL PROGRAMME

A COURSE OF LECTURES on Disorders of Joints will be given in the Lecture Room on FRIDAYS from 6 P.M. to 7 P.M. on the following dates :—

9th Jan.	Infective Arthritis	Mr. H. J. BURROWS
16th ,,	Tuberculous Disease of Joints	Mr. J. A. CHOLMELEY
30th ,,	Chemistry of Synovial Fluid	Dr. P. G. WALKER
6th Feb.	Rheumatoid Arthritis	Dr. R. NASSIM
13th ,,	Dislocations (Traumatic)	Mr. J. N. WILSON
20th ,,	Congenital Dislocation of the Hip	Mr. D. TREVOR
27th ,,	Pathology of Joint Disease	Dr. H. A. SISSONS
6th March	Cartilage in Joint Infection	Dr. C. H. LACK
13th ,,	Arthrodesis and Arthroplasty	Mr. K. I. NISSEN
20th ,,	Internal Derangement of the Knee	Mr. A. T. FRIPP

The fee for the full course will be 3 guineas, or for a single lecture 7*s.* 6*d.*

Tickets may be obtained on application to the Dean, at 234, Great Portland-street.

UNIVERSITY OF LONDON

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY
(incorporating the teaching facilities of Queen Charlotte's Maternity Hospital, Chelsea Hospital for Women, and the Department of Obstetrics and Gynæcology at Hammersmith Hospital)

Applications are invited from graduates with a registrable qualification for enrolment for the SPRING TERM (2ND MARCH–30TH MAY, 1959). Graduates attend each of the constituent hospitals in turn for clinical work, and attend lectures and special demonstrations at all 3 hospitals. Enrolment fee £3. Tuition fee £36 a term.

General practitioners wishing further experience in obstetrics may be accepted to attend the course at Queen Charlotte's Maternity Hospital for shorter periods—i.e., 2–4 weeks. They will have the opportunity of attending the labour ward in addition to combined classes of lectures and demonstrations at the 3 hospitals of the Institute. Ministry of Health grants are payable to approved general practitioners attending for a period of 1 or 2 weeks.

An INTENSIVE COURSE for those preparing for M.D. and M.R.C.O.G. will be held from 1ST to 13TH JUNE, 1959.

Hostel accommodation is available at Queen Charlotte's Hospital and at Hammersmith Hospital.

Further particulars can be obtained from the Secretary, Institute of Obstetrics and Gynæcology, Chelsea Hospital for Women, Dovehouse-street, London, S.W.3.

THE LONDON HOSPITAL MEDICAL COLLEGE

(UNIVERSITY OF LONDON)

THE HUTCHINSON PRIZE—2 OF VALUE £60 EACH

The subjects for the Prizes are: "A Contribution to Clinical Surgery", or "A Contribution to Clinical Medicine". Candidates, who must have been undergraduate students of The London Hospital, are eligible up to the expiration of 10 years from the date of commencement of clinical studies, excluding any time spent in compulsory national service and the period of pre-registration house appointments. The Dissertation to be addressed to the Secretary, The London Hospital Medical College, and delivered at the College not later than 4 P.M. on 31st July, 1961.

Further particulars may be obtained from the Secretary, The London Hospital Medical College, Turner-street, E.1.

THE LONDON HOSPITAL MEDICAL COLLEGE

(UNIVERSITY OF LONDON)

THE LIDDLE TRIENNIAL PRIZE

Under the Will of the late Dr. John Liddle, the Council of Governors of The London Hospital Medical College offer a Prize to the value of £200 for the best Essay on "Mechanisms Involved in Disturbances of Fluid Balance", which must be submitted on or before 31st July, 1961.

The conditions for this Prize may be obtained on application to the Dean. H. B. MAY, M.D., F.R.C.P., Dean.

The London Hospital Medical College,
Turner-street, E.1.

THE RESEARCH INSTITUTE, THE HOSPITAL FOR SICK CHILDREN, TORONTO, CANADA. RESEARCH FELLOWSHIPS. Beginning 1st July, 1959, vacancies are available in the general fields of surgery, bacteriology, virology, metabolism of bone, enzymology, immunology; and clinical investigation unit. Applications invited from medical graduates (Male or Female) with some interest in paediatrics. To start 1st July, 1959; salary $4800, live out.

Applications, with names and addresses of 2 referees, to be sent airmail to Director of Research Institute, The Hospital for Sick Children, Toronto.

UNIVERSITY COLLEGE OF THE WEST INDIES. Applications are invited for (*a*) SENIOR LECTURESHIP or (*b*) LECTURESHIP IN ANATOMY from candidates with registrable medical qualifications. Duties, to be assumed by 1st October, 1959, include lecturing in Human Anatomy and assistance in practical courses of Histology to students working for medical degrees of London University. Salary scales: (*a*) £1600–£100–£2300 p.a.; (*b*) £1200–£100–£1500–£100–£1900 p.a.; entry-point determined by qualifications and experience. Child allowance. F.S.S.U. Unfurnished accommodation at rent 5% basic salary. Passages for up to 5 persons on appointment, normal termination and triennial study leave.

Detailed applications (10 copies), naming 3 referees, by 26th January, 1959, to Secretary, Senate Committee on Colleges Overseas in Special Relation, University of London, Senate House, London, W.C.1, from whom further particulars may be obtained.

ROYAL MARSDEN HOSPITAL

SECOND WEEKEND SYMPOSIUM ON RECENT ADVANCES IN CANCER FOR CONSULTANTS, SENIOR HOSPITAL MEDICAL OFFICERS, AND SENIOR REGISTRARS
23RD–24TH JANUARY, 1959
(No charge will be made for this Course)

Friday, 23rd January, 1959

10 A.M. HEAD AND NECK
Mr. M. H. HARMER, Mr. V. F. HAMMOND (for Mr. W. A. MILL), Dr. M. LEDERMAN, Mr. R. W. RAVEN.

2 P.M. BREAST
Mr. A. L. ABEL, Mr. W. P. GREENING, Prof. A. HADDOW, Mr. R. W. RAVEN, Dr. P. RIGBY-JONES.

Saturday, 24th January, 1959

10 A.M. PELVIS
Mr. A. L. ABEL, Mr. J. B. BLAIKLEY, Dr. M. LEDERMAN.

Guest Lecturer: Dr. CUTHBERT DUKES.

2 P.M. BLADDER
Dr. H. J. G. BLOOM, Prof. F. BOYLAND, Dr. N. F. C. GOWING, Dr. H. E. M. LAY, Mr. D. M. WALLACE.

There will be time for discussion at the end of each subject. Applications for tickets should be made to the Department of Clinical Studies, Royal Marsden Hospital, Fulham-road, London, S.W.3.

FACULTY OF ANÆSTHETISTS OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND

Applications are invited from qualified medical practitioners of British nationality, specialising in anæsthetics, for a BURROUGHS WELLCOME FELLOWSHIP IN ANÆSTHESIA tenable at the University of California Medical Center, Los Angeles, for a period of 1 year from 1st September, 1959, value $4000.

Further information may be obtained from R. S. JOHNSON-GILBERT, ESQ., M.A., Secretary, Faculty of Anæsthetists, Royal College of Surgeons of England, Lincoln's Inn Fields, London, W.C.2, by whom applications must be received not later than 2nd February, 1959.

INSTITUTE OF BASIC MEDICAL SCIENCES

ROYAL COLLEGE OF SURGEONS OF ENGLAND
BRITISH POSTGRADUATE MEDICAL FEDERATION
(UNIVERSITY OF LONDON)

Applications are invited for the full-time post of LECTURER IN PHYSIOLOGY. The successful candidate will be expected to take part in the teaching activities of the Department. Facilities for research are available in the laboratories of the Department and also at the Buckston Browne Research Farm of the Royal College of Surgeons. The salary will be within the University scale (£1160–£100–£1650 plus £60 London allowance), together with membership of the F.S.S.U. and family allowances where applicable. The commencing salary will be determined by the age, qualifications and experience of the successful candidate.

Applications (12 copies), together with the names of 2 referees, should be sent not later than 10th January, 1959, to Mr. W. F. DAVIS, Secretary, Institute of Basic Medical Sciences, Royal College of Surgeons of England, Lincoln's Inn Fields, W.C.2, from whom further particulars may be obtained.

December, 1958. W. F. DAVIS, Secretary.

Hospital Services: Senior Appointments

AMENDED ADVERTISEMENT

ROYAL MARSDEN HOSPITAL, Fulham-road, London, S.W.3. Applications are invited for a post of CONSULTANT in the Radiotherapy Department at the above Hospital. The post is available immediately and is for 3 sessions a week. A member of the Department is a candidate.

Applications, quoting age, education, experience, and giving the names of 3 referees, should reach the House Governor by 31st December, 1958.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

1. CONSULTANT TRAUMATIC AND ORTHOPÆDIC SURGEON, whole-time or maximum sessions, Whittington Hospital, London, N.19 (1054 Beds). Duties will include overall supervision of the Casualty Department, together with attendances in the Friern Group of hospitals, New Southgate (approximately 2500 Beds for mental illness).

Applications before 19th January, 1959.

2. CONSULTANT GENERAL SURGEON, whole-time or maximum sessions, for 1 of 3 general surgical units at Whittington Hospital, London, N.19 (1054 Beds).

Applications before 26th January, 1959.

3. CONSULTANT DERMATOLOGIST, 2 half-days a week, Barnet General Hospital, Wellhouse-lane, Barnet, Herts (461 Beds). Dermatological beds will be shared with the present Consultant.

Applications before 28th January, 1959.

Hospitals may be visited by direct appointment.

Application forms obtainable from and returnable to Secretary, North West Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, W.2.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.

Tottenham Child Guidance Clinic, Lordship-lane, N.17

Part-time CONSULTANT PSYCHIATRIST (new post) for 2 sessions a week to act as Consultant-in-charge of clinic.

Regional Eye Centre, North Middlesex Hospital, N.18

Part-time CONSULTANT OPHTHALMIC SURGEON for 4 sessions a week at new Regional Eye Centre at North Middlesex Hospital. Duties include 1 outpatient session at The Prince of Wales's General Hospital, N.15.

Applications (6 copies), stating post(s) concerned, and names of 3 referees, should reach the Secretary, North East Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, London, W.2, by Saturday, 17th January, 1959.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Part-time CONSULTANT GENERAL SURGEON for 9 notional half-days weekly in the Greenwich and Deptford and Lewisham Groups of hospitals. The successful candidate will be required to undertake 3 sessions weekly in the Greenwich and Deptford Group and 6 sessions in the Lewisham Group, and to reside within a reasonable distance of the hospitals concerned. Candidates must have had a wide experience in general surgery and be Fellows of a Royal College of Surgeons. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales). Candidates may visit the hospitals concerned.

Applications, stating nationality, age, sex, qualifications and experience, including details of present appointments and of war or national service, together with the names and addresses of 3 referees, should be sent to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, London, W.2, not later than 10th January, 1959.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT MEDICAL DIRECTOR (Senior Hospital Medical Officer grade) to the South West London Mass Radiography Service. The successful candidate will work under the Medical Director of the Unit and will be based at the Western Hospital, Fulham, S.W.6.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, W.2, by 17th January, 1959. Applicants may visit Centre by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Part-time CONSULTANT E.N.T. SURGEON (Female) (2 half-days per week) in the Lambeth Group for duties at the South London Hospital for Women, S.W.4. Sessions at present Tuesday and Friday mornings.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, W.2, by 17th January, 1959. Applicants may visit Hospital by local arrangement.

ST. JAMES' HOSPITAL, Balham, London, S.W.12. Locum SENIOR CASUALTY OFFICER (Senior Hospital Medical Officer grade) required from 16th February to 10th May, 1959.

Applications to Group Secretary at above address, giving full details, including age, and names of 2 referees.

CHANNEL ISLANDS. JERSEY GENERAL HOSPITAL. (200 Beds.) Applications are invited for the post of VISITING E.N.T. SURGEON from practitioners holding F.R.C.S. or D.L.O. The post falls vacant on 1st January, 1959, and the salary is at the rate of £800 p.a. for 4 sessions weekly. The successful applicant will be required to be resident in the Island and a private practice is permitted.

Applications to be submitted not later than 3rd January, 1959, to the President, Public Health Committee, General Hospital, Jersey, C.I.

MANCHESTER REGIONAL HOSPITAL BOARD.

(*a*) Additional maximum Part-time CONSULTANT RADIOLOGIST to the Burnley and District Hospital Centre, mainly at the Victoria Hospital, Burnley, but including duties at Burnley General and Reedyford Memorial Hospitals. Wide experience and higher qualifications essential; appointee to live in or near Burnley, 30th December, 1958.

(*b*) Whole-time, NON-RESIDENT ASSISTANT PATHOLOGIST (Senior Hospital Medical Officer) for Ashton, Hyde and Glossop Hospital Centre, based on Ashton-under-Lyne General Hospital. Appointee will work under guidance of a Consultant and should have good experience in all branches of hospital pathology. 13th January, 1959.

(*c*) Whole-time RESIDENT ASSISTANT CHEST PHYSICIAN (Senior Hospital Medical Officer), Nab Top Sanatorium (100 Beds), Marple, near Stockport. Self-contained flat available in detached house in hospital grounds. Appointee will also assist at neighbouring chest clinics, but main duties will be at Nab Top, where he will be responsible to the Consultant Chest Physician for the clinical work and medical administration. Candidates should have good general experience and special training in tuberculosis. 5th January, 1959.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by the dates stated.

LEEDS REGIONAL HOSPITAL BOARD. Consultant in Ophthalmology, Leeds and Otley (8 notional half-days per week). Duties at hospitals in the Leeds A Group, outpatient facilities at the Leeds Public Dispensary and Hospital and inpatients at St. James's Hospital, Leeds. Higher qualification essential. Duties include 1 session per week at Otley General Hospital, consultative work in connection with the School Eye Service and relief duties at hospitals in the Harrogate and Ripon Group. The person appointed to reside in Leeds.

Applications (12 copies), stating age, qualifications, and details of appointments held, showing dates, with names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, by 20th January, 1959.

LANCASTER AND KENDAL HOSPITAL MANAGEMENT COMMITTEE. Locum CONSULTANT ANÆSTHETIST. 8 sessions per week. Salary according to individual grading.

Applications, with names of 2 referees, to Group Secretary, Royal Lancaster Infirmary, Lancaster.

NEWCASTLE REGIONAL HOSPITAL BOARD. Consultant ANÆSTHETIST whole-time for Sunderland Group of hospitals (358,000 population)—main hospitals: Sunderland General (641 Beds); Royal Infirmary (300 Beds); Ryhope General (282 Beds); Sunderland Orthopædic and Accident (120 Beds). Experience in neurosurgical anæsthesia would be an advantage.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 28 days.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD, ROMFORD CHILD GUIDANCE CLINIC. Part-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) for 3 sessions a week. Clinic serves Romford and Dagenham.

Applications (5 copies), and names of 3 referees, should reach the Secretary, 40, Eastbourne-terrace, W.2, by 17th January, 1959.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of Whole-time ASSISTANT PATHOLOGIST at the Glasgow Royal Maternity and Women's Hospital. Salary (at age 32 and over) on the scale £1653 15s.–£52 10s.–£2126 5s.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, not later than 30 days after the publication of this advertisement.

SHEFFIELD REGIONAL HOSPITAL BOARD. Consultant ORTHOPÆDIC SURGEON (maximum part-time) required for Lincoln Area with main duties at Lincoln County and St. George's Hospitals.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, 10. Forms to be returned by 10th January, 1958.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Part-time CONSULTANT in E.N.T. Surgery for 3 notional half-days a week in the Tunbridge Wells Group of hospitals. Candidates must have had wide experience in E.N.T. surgery and be Fellows of a Royal College of Surgeons. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales). Candidates may visit the hospitals concerned.

Applications, stating nationality, age, sex, qualifications and experience, including details of present appointment and of war or national service, together with the names and addresses of 3 referees, should be sent to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 40 Eastbourne-terrace, London, W.2, not later than 10th January, 1959.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Part-time CONSULTANT DERMATOLOGIST (2 half-days per week) for the Woking and Chertsey Group of hospitals. Duties mainly at St. Peter's Hospital, Chertsey (430 Beds). Busy department, with a Clinical Assistant for 3 half-days per week to assist with treatment and follow-ups.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, W.2, by 17th January, 1959. Applicants may visit Hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT MEDICAL DIRECTOR (Senior Hospital Medical Officer grade) to the Surrey Mass Radiography Service. The successful candidate will work under the Medical Director of the Unit for 7/11ths of his time (being based at Manor Farm, Church-road, Worcester Park, Surrey) and will also be required to act for 4/11ths of his time as Assistant Chest Physician to the Woking, Weybridge and Egham areas, based at the Central Chest Clinic at St. Peter's Hospital, Chertsey, Surrey.

Applications by letter (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, W.2, by 17th January, 1959. Applicants may visit Centres by local arrangement.

WELSH REGIONAL HOSPITAL BOARD. Consultant RADIOLOGIST, Mid Glamorgan Hospital Management Committee. Based at Neath General Hospital with visits to other hospitals in the Group. Successful candidate will be required to live within the Hospital Management Committee area. Optional whole-time maximum part-time appointment. Further particulars obtainable on request.

Applications (12 copies) to Senior Administrative Medical Officer, Welsh Regional Hospital Board, Temple of Peace, Cathays Park, Cardiff.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer) required, Cefn Coed Hospital, Swansea, 5th January, 1959, for approximately 3 months.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace and Health, Cathays Park, Cardiff.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens CONSULTANT ORTHOPÆDIC AND TRAUMATIC SURGEON required, Clwyd and Deeside Hospital Management Committee Area, immediately.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace and Health, Cathays Park, Cardiff.

WELSH REGIONAL HOSPITAL BOARD. Consultant RADIOLOGIST, Merthyr and Aberdare Hospital Management Committee, based at Merthyr General Hospital with visits to other hospitals in the Group. Successful candidate will be required to live within the area. Optional whole-time maximum part-time appointment.

Applications (12 copies) to Senior Administrative Medical Officer, Welsh Regional Hospital Board, Temple of Peace and Health, Cathays Park, Cardiff, within 21 days.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer) required, Morgannwg Hospital, Bridgend, immediately for approximately 3 months.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace and Health, Cathays Park, Cardiff.

Hospital Services: Junior Appointments

CONNAUGHT HOSPITAL, Walthamstow, E.17. Locum SENIOR SURGICAL REGISTRAR required from 29th December, 1958, to 11th January, 1959, inclusive, at above Hospital.

Apply Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

DREADNOUGHT SEAMEN'S HOSPITAL, Greenwich, S.E.10. HOUSE PHYSICIAN (pre-registration) required on 17th January, 1959.

Applications, stating age, nationality, qualifications and experience, with the names of 3 recent referees, should be sent to the Secretary at the above address not later than 3rd January.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, N.21. HOUSE SURGEON for Gynaecological and General Surgery.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, London, N.W.8. Applications are invited from pre-registration or registered medical practitioners (Male) for the appointment of HOUSE SURGEON to the Midwifery and Gynaecological Departments to become vacant by the middle of January, 1959. Appointment will be for a period of 6 months. National Health Service salary.

Applications to reach the Secretary on or before Monday, 29th December, together with copies of 3 recent testimonials.

LEWISHAM HOSPITAL, London, S.E.13. Applications are invited for the post of SENIOR HOUSE OFFICER (orthopaedics). Vacant 26th January, 1959, and recognised for 6 months' training for F.R.C.S. Salary £819 10s. less £150 for residential emoluments.

Applications, stating age, qualifications and experience, with copy testimonials or names of referees, to the Group Secretary, Lewisham Hospital, S.E.13.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of REGISTRAR in General Surgery vacant in January, 1959. A higher qualification, although desirable, is not essential. The appointment will be for 1 year, renewable for a further year, 1 of which will be spent in the Department of Thoracic Surgery or at the hospitals Annexe at Brentwood.

Applications (10 copies), giving the names and addresses of 3 referees, should be received by the undersigned by 14th January, 1959. H. BRIERLEY, House Governor.

MIDDLESEX HOSPITAL, W.1, and NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications invited for post of SENIOR OBSTETRIC AND GYNÆCOLOGICAL REGISTRAR. Subject to annual reappointment the appointment will involve 2 years at the Whittington Hospital under the control of the North West Metropolitan Regional Hospital Board followed by 2 years at the Middlesex Hospital and the Hospital for Women, Soho.

Forms of application, obtainable from the Deputy Superintendent, The Middlesex Hospital, should be returned, naming 2 referees, by 10th January.

MILDMAY MISSION HOSPITAL, Austin-street, London, E.2. Applications are invited for the pre-registration post of RESIDENT HOUSE SURGEON (post recognised for F.R.C.S.) vacant January, 1959. Candidates should be in sympathy with the evangelical Christian aims of the Hospital.

Applications and references to be addressed to the Medical Superintendent as soon as possible.

MILDMAY MISSION HOSPITAL, Austin-street, London, E.2. Applications are invited for the pre-registration post of RESIDENT HOUSE PHYSICIAN CASUALTY OFFICER, vacant January, 1959. Candidates should be in sympathy with the evangelical Christian aims of the Hospital.

Applications and references to be addressed to the Medical Superintendent as soon as possible.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of SURGICAL REGISTRAR at The National Hospital, Queen-square, London, W.C.1. This post carries the grade of Senior Registrar. The appointment will be for 1 year in the first instance.

Applications, with names of 3 referees, to be sent to the undersigned not later than 2nd January, 1959.

H. EWART MITCHELL, Secretary to the Board of Governors.
The National Hospitals for Nervous Diseases,
Queen-square, London, W.C.1.

NELSON HOSPITAL, Kingston-road, Merton, S.W.20. (123 Beds.) RESIDENT ANÆSTHETIST (Senior House Officer grade) with certain duties as House Physician in the Children's Ward and Casualty Department. Post recognised for D.A. Vacant 1st January, 1959.

Applications, stating age, qualifications and experience, with copies of testimonials and the name of 1 referee, should be sent to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

NEASDEN HOSPITAL (Acute Infectious Diseases), Brentfield-road, London, N.W.10. SENIOR HOUSE OFFICER (resident) required, 1st January, 1959, or by arrangement. Hospital offers wide clinical experience of acute medicine and is a Regional Poliomyelitis Centre. Excellent opportunities for post-graduate studies.

Applications to the Physician-Superintendent.

NORTH LONDON BLOOD TRANSFUSION CENTRE, Deansbrook-road, EDGWARE, MIDDLESEX. JUNIOR HOSPITAL MEDICAL OFFICER for full-time duties with mobile teams at donor sessions. The appointment is for 3 years.

Applications, giving age, qualifications, experience, and names of 2 referees, to the Director, not later than 3rd January, 1959.

NORTH MIDDLESEX HOSPITAL AND EDMONTON CHEST CLINIC, London, N.18. Applications are invited for the post of SENIOR HOUSE OFFICER, resident, for beginning of February, 1959. Duties, at above Hospital and Chest Clinic under the direction of the Chest Physician, include care of tuberculous and non-tuberculous chest cases. Further details on request. Appointment for 6 months in the first instance with possible extension to 1 year.

Applications, giving full particulars of qualifications, experience, &c., with copies of recent testimonials and/or names of 2 referees, should reach the Hospital Secretary not later than 31st December.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. Applications are invited immediately from candidates holding their M.R.C.O.G. for the part-time post of Locum SENIOR REGISTRAR (6 sessions) for 6 months in the first instance. Duties will be at Queen Charlotte's Maternity Hospital and Chelsea Hospital for Women.

Apply, stating age, qualifications with dates and previous appointments, together with the names of referees, to the House Governor, 339, Goldhawk-road, London, W.6.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN, Hackney-road, E.2; Shadwell, E.1; BANSTEAD, SURREY. SENIOR RESIDENT MEDICAL OFFICER (Male or Female), graded Senior House Officer, at Hackney-road, E.2. Senior of 8 House Officers in a hospital engaged in postgraduate and undergraduate teaching. Previous paediatric experience essential. Appointment will be for 1 year from 1st March, 1959.

Application forms (obtainable from the Secretary at Hackney-road) should be returned with copies of 3 testimonials, not later than 3rd January, 1959.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. HOUSE PHYSICIAN (third post) required for 2 general medical inpatient wards at Plaistow Hospital. Inpatient work only at present. 6-month appointment, commencing 1st February, 1959. Suitable for postgraduate study for higher diploma in medicine.

Apply to Hospital Secretary, giving names of 3 referees, by 27th December, 1958.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. HOUSE SURGEON (pre-registration) required for 6 months commencing as soon as possible. Post recognised for F.R.C.S.

Applications, with copies of recent testimonials, to Hospital Secretary by 27th December, 1958.

ROYAL FREE HOSPITAL. Applications are invited for the post of SENIOR REGISTRAR to the Diagnostic X-ray Department at the Royal Free Hospital. The post is non-resident for 1 year in the first instance, duties to commence as soon as possible. Candidates are required to hold the D.M.R.(D).

Formal applications, giving details of experience, &c., together with the names of 3 referees, should be sent to the Secretary to the Board of Governors, The Royal Free Hospital, Gray's Inn-road, W.C.1, not later than 29th December, 1958.

ROYAL MASONIC HOSPITAL, Ravenscourt Park, London, W.6. Applications are invited for the post of RESIDENT MEDICAL REGISTRAR. Appointment about 1st February, 1959. Gross salary: first year £935 (residential emoluments of £130 deductible); second year £1061 10s. (residential emoluments of £145 deductable).

Please state age, qualifications, past and present appointments, and include 2 recent testimonials and/or the names of 2 referees. Applications should reach the undersigned (from whom further information may be obtained) as soon as possible, and in any event not later than 5th January, 1959.

R. E. LAWSON, Secretary and House Governor.

ROYAL NORTHERN HOSPITAL, Holloway, N.7. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (pathology) for Group Laboratory, vacant 14th January, 1959. The appointment will afford ample opportunity for study for a higher degree in medicine or surgery.

Applications to be sent to the Hospital Secretary by 3rd January, 1959.

ST. ANDREW'S HOSPITAL, Bow, E.3. House Physician required. Recognised pre-registration post.

Applications, with copy of at least 1 testimonial, to the Hospital Secretary.

ST. FRANCIS HOSPITAL, Constance-road, East Dulwich, S.E.22. SENIOR HOUSE OFFICER required in the Group Geriatric Unit under direction of full-time Geriatrician. The unit is associated with a half-way house; there are follow-up and pre-admission outpatient clinics and facilities for investigations. Resident post.

Apply giving age, qualifications and experience, with copy testimonials or names of 2 referees, to Group Secretary, Camberwell Hospital Management Committee, Dulwich Hospital, East Dulwich-grove, S.E.22, not later than 30th December.

ST. GILES' HOSPITAL, Camberwell, S.E.5. Orthopædic REGISTRAR from 23rd February, 1959, for 3 months' Locum Tenens duty.

Apply, giving full details, to Group Secretary, Camberwell Hospital Management Committee, Dulwich Hospital, East Dulwich-grove, S.E.22, or inquiries to Orthopædic Consultant, St. Giles' Hospital.

ST. BARTHOLOMEW'S HOSPITAL, E.C.1. Applications are invited for the post of REGISTRAR or SENIOR REGISTRAR in the Department of Neurological Surgery. The post will be tenable from 1st April, 1959, and the grading of the successful candidate will be dependent on his qualifications and experience.

Applicants must be in possession of the F.R.C.S. (Eng.) and should submit a copy of their application, together with the names of 2 referees, to reach the undersigned within the next 21 days. C. C. CARUS-WILSON, Clerk to the Governors.

ST. GEORGE'S HOSPITAL, S.W.1. Applications are invited for the post of SENIOR REGISTRAR to the Department of Pathology. The appointment will be for 1 year in the first instance, and the successful candidate will be required to take up duty on, or as soon as possible after, 23rd February, 1959. The work will include training in all branches of hospital pathology, including morbid anatomy.

Applications, stating age, education, qualifications, experience, and the names of 2 referees, should reach the undersigned not later than 3rd January, 1959.

P. H. CONSTABLE, House Governor.

ST. LEONARD'S HOSPITAL, Nuttall-street, London, N.1. Applications are invited from registered or provisionally registered medical practitioners for the post of HOUSE SURGEON for 6 months.

Applications, with 2 recent testimonials, to Hospital Secretary, by 3rd January, 1959.

ST. MARY'S HOSPITAL FOR WOMEN AND CHILDREN, Upper-road, Plaistow, London, E.13. HOUSE SURGEON (pre-registration, first, or second post) to commence 27th January, 1959. Duties include general surgery, gynæcology, and E.N.T.

Apply to Hospital Secretary, immediately.

ST. MARY'S HOSPITAL, W.2. House Officer to the Almroth Wright Wards (graded Senior House Officer) required for 8 months with effect from 1st February, 1959 (first 2 months non-resident, remaining 6 months resident).

Applications, giving full details, with names and addresses of 3 referees, should reach the House Governor not later than 1st January, 1959.

ST. PETER'S, ST. PAUL'S AND ST. PHILIP'S HOSPITALS. Required, REGISTRAR in Anæsthetics. Non-resident appointment on an annual basis.

Applications (12 copies), and names and addresses of 2 referees, to the House Governor, St. Peter's Hospital, Henrietta-street, London, W.C.2. Closing date 10th January, 1958.

ST. STEPHEN'S HOSPITAL, Fulham-road, Chelsea, S.W.10. OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON. Resident. Post-registration. Post recognised for D.Obst.R.C.O.G. Vacancy 18th February.

Applications, naming 2 referees, to Medical Superintendent.

ST. STEPHEN'S HOSPITAL, Fulham-road, Chelsea, S.W.10. HOUSE PHYSICIAN (general medicine). Resident. Post- or pre-registration. Vacancy approximately 14th January.

Applications, naming 2 referees, to Medical Superintendent.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 18th March, 1959, for a Full-time ORTHODONTIC REGISTRAR.

Further particulars and application form, to be returned by 5th January, 1959, obtainable from the House Governor.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 1st April, 1959, for a MEDICAL REGISTRAR AND PATHOLOGIST (Senior Registrar grade).

Further particulars and application form, to be returned by 5th January, 1959, obtainable from the House Governor.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 6th March, 1959, for an ASSISTANT RESIDENT MEDICAL OFFICER (Senior House Officer grade) at the Country Branch, Tadworth, Surrey.

Further particulars and application form, to be returned by 1st January, 1959, obtainable from the House Governor.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.1, and THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.1. Applications are invited for the appointment of SENIOR REGISTRAR to work in the X-ray Diagnostic Departments at University College Hospital (6 half-days a week) and at The Hospital for Sick Children (5 half-days a week) for 1 year in the first instance from 1st February, 1959, or as soon as possible thereafter.

Applications, with the names of 2 referees, to T. F. W. MACKEOWN, Administrator and Secretary, University College Hospital, Gower-street, W.C.1, by 5th January, 1959.

WEST LONDON HOSPITAL, Hammersmith-road, W.6. RESIDENT SENIOR HOUSE OFFICER (anæsthetics) required for 6 months from 1st February.

Detailed applications, copies 2 recent testimonials, to Secretary by 7th January.

WEST LONDON HOSPITAL, Hammersmith-road, W.6. RESIDENT CASUALTY OFFICER (Senior House Officer grade) required for 6 months from 1st February.

Detailed applications, copies 2 recent testimonials, to Secretary by 7th January.

WESTMINSTER CHILDREN'S HOSPITAL. Westminster HOSPITAL TEACHING GROUP. CASUALTY OFFICER required for 6 months from 1st February, 1959. Grade House Officer (post-registration) or Senior House Officer dependent on experience. Pædiatric experience preferred.

Apply, with copies of 3 testimonials, to the Secretary, Westminster Children's Hospital, Vincent-square, S.W.1, by 2nd January, 1959.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN required at Ashton-under-Lyne General Hospital. Vacant mid-February, 1959. Preference given to pre-registration candidates.

Applications, with copies of 2 testimonials, to Group Secretary, General Hospital, Ashton-under-Lyne.

ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGEMENT COMMITTEE.

SENIOR HOUSE OFFICER (obstetrics/gynæcology) required at Ashton-under-Lyne General Hospital. Bed complement 75 obstetrics and 26 gynæcology. Recognised for M.R.C.O.G. Vacant February, 1959.

HOUSE OFFICER (midwifery) required. Post recognised for D.Obst.R.C.O.G., vacant February, 1959. Preference given to pre-registration candidates.

Applications, with copies of 2 testimonials, to Group Secretary, General Hospital, Ashton-under-Lyne, Lancs.

ABERYSTWYTH, CARDIGANSHIRE. GENERAL HOSPITAL. MID-WALES HOSPITAL MANAGEMENT COMMITTEE. Pre-registration HOUSE SURGEON and HOUSE PHYSICIAN required at the above Hospital. Both vacancies occur on 1st January, 1959. Surgical post recognised for F.R.C.S.

Applications, quoting 2 referees, to Group Secretary, 31, North Parade, Aberystwyth, Cardiganshire, immediately.

ASHFORD HOSPITAL, Ashford, Middlesex. North West METROPOLITAN REGIONAL HOSPITAL BOARD. RESIDENT MEDICAL REGISTRAR required at above Hospital for general medical unit. Post vacant 1st January, 1959. Hospital may be visited by direct appointment with Medical Director.

Application forms obtainable from and returnable to Secretary, Staines Group Hospital Management Committee, Ashford Hospital, Ashford, Middlesex, by 5th January, 1959.

AYLESBURY, BUCKINGHAMSHIRE. ROYAL BUCKINGHAMSHIRE HOSPITAL. HOUSE OFFICER (accident and orthopædic and children's general surgery) required 1st February, 1959. Pre-registration post but registered practitioners invited to apply.

Apply, with 2 names for reference, to Secretary-Superintendent.

AYLESBURY. ROYAL BUCKINGHAMSHIRE AND ASSOCIATED HOSPITALS MANAGEMENT COMMITTEE. Applications are invited for the appointments of HOUSE SURGEON HOUSE PHYSICIAN to run consecutively for a period of 6 months in each post at Tindal General Hospital and Stoke Mandeville Hospital, commencing 1st February, 1959. Posts recognised for pre-registration.

Applications, with copies of 2 testimonials, to the Administrative Officer, Tindal General Hospital, Aylesbury.

BANBURY, OXFORDSHIRE. HORTON GENERAL HOSPITAL. (162 Beds.) Locum CASUALTY OFFICER required, 23rd–31st December. Salary according to experience up to Junior Hospital Medical Officer grade.

Applications to the Secretary.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE PHYSICIAN (pre-registration) required immediately.

Applications, naming 2 referees, to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BEDFORD GENERAL HOSPITAL. (424 Beds.) House SURGEON required. Pre- or post-registration, recognised for F.R.C.S. Post offers exceptional opportunities for general experience in busy acute surgical units. Holder of this appointment will be favourably considered for appointment as House Physician at the termination of contract.

Applications, with copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 acute beds.)

(*a*) ASSISTANT PATHOLOGIST (Senior House Officer grade) required for the Area Laboratory. Offers experience all branches of pathology. Vacant now.

(*b*) HOUSE SURGEON (Senior House Officer or House Officer grading according to experience). Recognised for F.R.C.S. General surgery.

(*c*) HOUSE PHYSICIANS (2), Senior House Officer or House Officer grading according to experience.

(*d*) ORTHOPÆDIC HOUSE SURGEON (Senior House Officer or House Officer grading according to experience). Recognised for F.R.C.S.

(*e*) HOUSE SURGEON (Senior House Officer or House Officer grading according to experience). Part general surgery; part orthopædics.

Posts (*b*), 1 of (*c*), and (*d*) are approved pre-registration posts, but fully registered practitioners may apply. All except (*a*) are vacant end January. Married accommodation may be available.

Detailed applications to Group Secretary.

BIRMINGHAM ACCIDENT HOSPITAL, Bath-row, BIRMINGHAM, 15. (215 Beds and 8 House Surgeons.) HOUSE SURGEONS (resident), posts now vacant. Hospital treats over 50,000 injured patients each year, and is recognised for purpose of casualty training by R.C.S. (Eng.). 6-month appointment, part of which may be spent in 42-bedded segregated Burns Unit.

Apply, naming 2 referees, to Administrator.

BIRMINGHAM. LORDSWOOD MATERNITY HOSPITAL, HARBORNE, BIRMINGHAM, 17. OBSTETRIC HOUSE OFFICER (resident). Post vacant 1st February. 33 Beds dealing with normal and abnormal midwifery. Recognised for D.Obst.R.C.O.G. Second period training school for pupil midwives.

Applications to the Obstetrician not later than 31st December, 1958.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE BIRMINGHAM MATERNITY HOSPITAL. Applications are invited from registered medical practitioners for the post of RESIDENT OBSTETRIC HOUSE SURGEON vacant on 1st March, 1959. The appointment is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G.

Application forms obtainable from the House Governor, The Birmingham and Midland Hospitals for Women, Showell Green-lane, Sparkhill, Birmingham, 11, to be returned not later than 6th January, 1959. G. A. PHALP, Secretary.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE CHILDREN'S HOSPITAL, Ladywood-road, BIRMINGHAM, 16. Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade), vacant in February, 1959. The post is suitable for persons training for paediatrics or contemplating a career in pathology. The holder is expected to attend clinical rounds and meetings and to assist in the investigation of clinical problems.

Forms of application, obtainable from the House Governor, should be returned to him by 31st December, 1958.

G. A. PHALP, Secretary to the Board of Governors.

BIRMINGHAM REGIONAL HOSPITAL BOARD. NORTH STAFFORDSHIRE ROYAL INFIRMARY. Whole-time Locum Tenens SENIOR REGISTRAR in Ophthalmology. Wide experience specialty essential. Vacant now. Salary £26 8s. weekly less emoluments.

Apply immediately to the Secretary, Regional Hospital Board, 10, Augustus-road, Birmingham, 15.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) Birmingham (Sally Oak) Group, Oak Tree-lane, Birmingham 29

(*a*) REGISTRAR (general surgery) (resident) for Solihull Hospital, Lode-lane, Solihull. Single quarters only available. Higher qualifications desirable.

(*b*) REGISTRAR (surgical) for Birmingham Accident Hospital, Birmingham, 15 (215 Beds). Duties on accident surgery team with possibility of transfer to Burns Unit. General surgical experience essential. Higher qualification an advantage.

(2) Stoke-on-Trent Group, Princes-road, Stoke-on-Trent

REGISTRAR (obstetrics and gynaecology). Duties at City General and Limes Maternity Hospital (obstetrics 100 Beds, gynaecology 40 Beds). Experience specialty essential. Resident/non-resident. Recognised of M.R.C.O.G./D.Obst.R.C.O.G.

(3) West Bromwich Group, West Bromwich and District General Hospital, Edward-street, West Bromwich

Locum Tenens SURGICAL REGISTRAR for Hallam Hospital, West Bromwich (428 Beds), required for month of January, 1959. Resident. Salary £19 5s. p.w. less any charges. Experience specialty essential.

Application forms from Group Secretaries to be returned (to 16, 2) by 29th December, and (3) immediately.

BIRMINGHAM, 13. SORRENTO MATERNITY HOSPITAL, Wake Green-road. (106 Beds, including 31 premature-baby cots.) OBSTETRIC HOUSE SURGEON. Recognised for D.Obst.R.C.O.G. Hospital affiliated to Birmingham Medical School for training of students. Vacant 1st February, 1959.

Apply Obstetrician by 31st December, 1958.

BIRMINGHAM, 18. SUMMERFIELD HOSPITAL. (1082 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER in Geriatrics (fourth post). Non-resident. The unit provides ample opportunities for those wishing to specialise in geriatric medicine, having all the resources of a modern hospital and a large domiciliary visiting scheme.

Applications, with names of 2 referees, to Group Secretary, Dudley Road Hospital, Birmingham, 18.

BISHOP AUCKLAND, Co. DURHAM. THE GENERAL HOSPITAL. (350 Beds.) HOUSE PHYSICIAN required. Fully registered or provisionally registered practitioner.

Apply, naming 2 referees, to K. G. T., LUXFORD, Group Secretary, South West Durham Hospital Management Committee, at the above address.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. (350 Beds.) SENIOR HOUSE OFFICER in Surgery required. Post recognised for the F.R.C.S. Furnished or unfurnished flat, comprising 2 bedrooms, sitting-room, dining-room kitchen, bathroom and w.c., in Hospital grounds.

Apply within 14 days, naming 2 referees, to Group Secretary, South West Durham Hospital Management Committee, at above address.

BISHOP AUCKLAND. THE GENERAL HOSPITAL. (350 Beds.) RESIDENT SENIOR HOUSE OFFICER in Medicine required.

Apply within 14 days, giving details, and the names of 3 referees, to the Group Secretary, South West Durham Hospital Management Committee, at the above address.

BRADFORD A AND B HOSPITAL MANAGEMENT COMMITTEES. JUNIOR HOUSE OFFICER required for Geriatric Admission Unit. Post vacant now. Major portion of duties carried out at St. Luke's Hospital, Bradford.

Applications, stating age, nationality, qualifications and experience, with copy testimonials, to the Secretary, Royal Infirmary, Bradford, Yorks.

BRADFORD CHILDREN'S HOSPITAL, Yorkshire. (100 Beds.) SENIOR HOUSE OFFICER (Male or Female) required. Vacant 1st February, 1959. Recognised for D.C.H.

Applications, stating age, qualifications, experience and nationality, together with copy testimonials, to the Secretary, Royal Infirmary, Bradford.

BRADFORD ROYAL INFIRMARY, Bradford, Yorkshire. (507 Beds.) SENIOR HOUSE SURGEON (Thoracic Unit) required. Vacant 1st February, 1959.

Applications, stating age, experience, nationality, qualifications, with copy testimonials, to the Secretary.

BRADFORD, YORKSHIRE. ROYAL EYE AND EAR HOSPITAL. (105 Beds.) SENIOR HOUSE OFFICER required for E.N.T. Department of 56 Beds. Recognised for D.L.O. and F.R.C.S. Post vacant 3rd January, 1959.

Applications, stating age, nationality, qualifications and experience, with copy testimonials, to the Secretary, Royal Infirmary, Bradford.

BOURNEMOUTH (near). CHRISTCHURCH HOSPITAL, CHRISTCHURCH, HAMPSHIRE. (334 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN (pre-registration interne) required for post becoming vacant on 10th February, 1959.

Applications to the Hospital Secretary.

BOURNEMOUTH (near). CHRISTCHURCH HOSPITAL, CHRISTCHURCH, HAMPSHIRE. (334 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of HOUSE SURGEON (pre-registration interne). Post vacant on 18th January, 1959.

Applications to the Hospital Secretary.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of 2 HOUSE SURGEONS (general surgery). The appointments, which are vacant now, are recognised for the F.R.C.S. examination and for pre-registration purposes.

Applications to the Hospital Secretary.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of 2 HOUSE PHYSICIANS. The appointments, which become vacant on 31st January and 6th February, 1959, respectively, are recognised for pre-registration purposes.

Applications to the Hospital Secretary.

BRENTWOOD, ESSEX. WARLEY HOSPITAL. Senior HOUSE OFFICER required. The Hospital is situated within easy reach of London by main line electric service and bus. There are over 2000 Beds, and a wide experience of all types of mental disorders, including the neuroses, can be obtained. All modern treatments are carried out, including psychosurgery. Visiting Consultants in other specialties attend regularly. Teaching by senior staff and facilities for attending postgraduate courses are provided; also experience of outpatient clinics. Regular clinical meetings are held. Salary £819 10s. p.a. The post is resident and £150 is deducted for excellent residential amenities—no accommodation available for married man.

Applications, with full details and names of 2 referees, to Physician-Superintendent.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) SENIOR CASUALTY OFFICER (Junior Hospital Medical Officer grade) required for busy Casualty Department (2 junior medical staff). Recognised for F.R.C.S.

Applications, stating age, qualifications and experience, together with the names of 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) CASUALTY HOUSE SURGEON required end December. Full and varied experience in busy Casualty Department (staff of 3), and also duties in Orthopaedic and Traumatic Unit, including charge of beds. Recognised for pre-registration and F.R.C.S.

Applications, stating age, qualifications, experience, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (314 Beds.) HOUSE SURGEON (including gynaecology) required 1st February, 1959. Pre-registration and recognised for F.R.C.S.

Applications, stating usual particulars, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRISTOL. COSSHAM AND FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. FRENCHAY HOSPITAL. SENIOR HOUSE OFFICER, Regional Department of Neurosurgery. Vacant immediately, tenable for 6–12 months. The post offers useful surgical experience and the opportunity of gaining a working knowledge of neurological diagnosis. Recognised for F.R.C.S.

Applications to Group Secretary, Frenchay Hospital, quoting "N.S.F." Names of 2 referees required.

BURNLEY AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. BURNLEY GENERAL HOSPITAL (650 Beds). REEDYFORD MEMORIAL HOSPITAL, NELSON (95 Beds). RESIDENT HOUSE OFFICERS (surgical). The appointments are approved as pre-registration posts and recognised for F.R.C.S. Subject to satisfactory service, the successful applicants will be favourably considered for appointment as House Physicians at the termination of contract as Surgical House Officer.

Applications, with 2 references, to Group Secretary, Burnley General Hospital.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. ROSSENDALE GENERAL HOSPITAL. MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for the post of REGISTRAR in General Surgery at the above Hospital. This is a new post, and is at present vacant.

Apply, stating full details, together with the names of 2 referees, to H. WILKINSON, Esq., Group Secretary, Bury General Hospital, Bury, Lancs.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. BURY GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER in Pathology (1 of 2 such posts) for the above Group of Hospitals. The successful applicant will be based at Bury General Hospital.

Apply, stating full details, together with the names of 2 referees, to H. WILKINSON, Esq., Group Secretary, Bury General Hospital, Bury, Lancs.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the 2 vacant posts of HOUSE PHYSICIAN (pre-registration) in the above Group.

Apply, stating full details, and names of 2 referees, to H. WILKINSON, Group Secretary, Bury General Hospital, Bury, Lancs.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. Locum JUNIOR HOSPITAL MEDICAL OFFICER (E.N.T.) required for the period 26th January, 1959–2nd May, 1959. Post is based at Bury General Hospital, where accommodation can be provided, but the applicant will also be required to undertake duties with the Rochdale Hospital Management Committee.

Applications, stating full details and names of 2 referees, to Group Secretary, Bury General Hospital, Bury, Lancs.

BURTON-ON-TRENT GENERAL HOSPITAL. (251 Beds.) ANÆSTHETIST (Junior Hospital Medical Officer grade). Busy general base hospital for area. 8 residents. Excellent experience. Recognised for D.A. Single furnished accommodation.

Applications to Group Secretary, General Hospital, Burton-on-Trent, Staffordshire.

BURTON-ON-TRENT GENERAL HOSPITAL. (251 Beds.) HOUSE SURGEONS (general), pre-registration. Busy general base hospital for area. 8 residents. Full Consultant service. Excellent experience. Recognised for F.R.C.S. Married accommodation will be available for a joint post.

Applications to Group Secretary, General Hospital, Burton-on-Trent, Staffordshire.

BURTON-ON-TRENT. THE GENERAL HOSPITAL. HOUSE OFFICER (orthopædics) (pre-registration post) required at the above Hospital. Recognised for F.R.C.S.

Applications to Group Secretary as soon as possible.

BUXTON. DEVONSHIRE ROYAL HOSPITAL. House OFFICER required.

Applications to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw Heath, Stockport.

CAERPHILLY DISTRICT HOSPITAL. (Acute General Hospital—226 Beds. 6 miles from Cardiff.) RHYMNEY AND SIRHOWY VALLEYS HOSPITAL MANAGEMENT COMMITTEE. 2 HOUSE SURGEONS. 1st February. 1 with duties in Orthopædic Department ; both recognised for F.R.C.S.

Applications to the Secretary.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) E.N.T. and Eye Departments. SENIOR HOUSE OFFICER. Salary £819 10s. p.a. Post vacant January, 1959. Approved for F.R.C.S. and special diplomas.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) The post of SENIOR HOUSE PHYSICIAN is now vacant. Salary £819 10s. p.a., with National Health Service conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARDIFF. GLAN ELY HOSPITAL, Fairwater, Cardiff. (240 Beds.) SENIOR HOUSE OFFICER required. Tuberculosis, both pulmonary and non-pulmonary, and allied chest conditions are treated. Experience available in thoracic surgery and operative treatment of bone and joint, genitourinary and glandular tuberculosis.

Form of application from Group Secretary, 44, Cathedral-road, Cardiff.

CARLUKE, LANARKSHIRE. LAW HOSPITAL. (780 Beds.) Applications are invited for the post of RESIDENT GYNÆCOLOGICAL HOUSE OFFICER (pre- or post-registration) for the 6 months commencing 1st February, 1959. The post is recognised for the M.R.C.O.G., and the successful applicant will, if he or she so desires, be given the opportunity of a 6 months' obstetrical post to follow.

Applications, stating age, qualifications and any previous experience, together with the names of 2 referees, should be submitted to the Group Medical Superintendent, Law Hospital, Carluke.

CARMARTHEN. WEST WALES GENERAL HOSPITAL. (280 Beds.) Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER in the Ophthalmic Department of the above Hospital. Immediate vacancy.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be sent to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

CASTLEFORD, NORMANTON AND DISTRICT HOSPITAL, HIGHTOWN, CASTLEFORD. RESIDENT CASUALTY OFFICER (Senior House Officer grade) required. Married accommodation available.

Apply immediately to the Secretary, Pontefract and Castleford Hospital Management Committee, Great Northern House, Salter Row, Pontefract, Yorkshire.

CHELTENHAM GROUP HOSPITAL MANAGEMENT COMMITTEE. Rotating Internship. A vacancy occurs for a HOUSE PHYSICIAN, pre- or post-registration, at the Cheltenham General Hospital. The successful candidate, on completion of his 6 months, will be offered the post of House Surgeon, followed by that of Resident Obstetric Officer in the Group if desired.

Applications, stating age and experience and names of 2 referees, to be sent to the Group Secretary, General Hospital, Cheltenham.

CHELTENHAM GROUP HOSPITAL MANAGEMENT COMMITTEE. Rotating Internship. A vacancy occurs for a HOUSE SURGEON, pre- or post-registration, at the Cheltenham General Hospital. The successful candidate on completion of his 6 months will be offered the post of House Physician, followed by that of Resident Obstetric Officer in the Group, if desired.

Applications, stating age and experience, and names of 2 referees, to be sent to the Group Secretary, General Hospital, Cheltenham.

CHESTER-LE-STREET. GENERAL HOSPITAL. (204 Beds.)

SENIOR HOUSE OFFICER (general surgery). Post vacant 1st February, 1959.

HOUSE PHYSICIANS (general medicine), 2 vacancies. Approved pre-registration appointments. Posts vacant 1st February, 1959.

Apply, with particulars of previous experience, and the names and addresses of 2 referees, to Group Secretary, Dryburn Hospital, Durham.

CHESTERFIELD ROYAL HOSPITAL. House Physician required mid-January. Post recognised for pre-registration purposes, and if desired, surgical posts can be offered after 6 months.

For further information, please apply to the Group Secretary.

CHESTERFIELD ROYAL HOSPITAL. 2 House Surgeons required mid-January. Posts recognised for pre-registration and F.R.C.S. purposes, and if desired medical posts can be offered after 6 months.

For further information, please apply to the Group Secretary.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL. (Late Botley's Park War Hospital.) (440 Beds.) RESIDENT HOUSE SURGEON (intern) required. Post recognised for pre-registration service. Salary in accordance with terms and conditions of National Health Service. Post vacant now.

Applications, with names and addresses of referees, to Physician-Superintendent.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL. (Late Botley's Park War Hospital.) (430 Beds.) Locum RESIDENT ANÆSTHETIC SENIOR HOUSE OFFICER required 5th–18th January.

Applications, with names of referees, to Physician-Superintendent.

CHESTER ROYAL INFIRMARY. Chester and District HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT CASUALTY OFFICER (Junior Hospital Medical Officer), vacant 31st January, 1959.

Applications, giving full details, together with the names and addresses of 2 referees, should be forwarded to the Hospital Secretary.

CHESTER AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. GROUP PATHOLOGICAL DEPARTMENT. Applications are invited for the post of SENIOR HOUSE OFFICER in Pathology, vacant now.

Applications, giving full details, together with the names and addresses of 2 referees, should be forwarded to the Hospital Secretary, Chester Royal Infirmary.

CHESTER ROYAL INFIRMARY. Chester and District HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of ANÆSTHETIST (Senior House Officer grade). The post is recognised for D.A.

Applications, giving full details, together with the names and addresses of 2 referees, should be forwarded to the Hospital Secretary.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for :—

Essex County Hospital, Colchester, Essex (181 Beds)

Post of SENIOR HOUSE OFFICER to Casualty and Radiotherapy Departments. Post tenable for 6 months or 1 year. Recognised for F.R.C.S.

Essex County Hospital, Colchester. Colchester Maternity Hospital

Post of Locum Tenens REGISTRAR (obstetrics and gynæcology) for period 29th December, 1958–8th January, 1959.

Black Notley Hospital, Braintree, Essex (522 Beds)

Post of HOUSE SURGEON. Pre-registration or third post. Includes duties in general surgical and gynæcological wards. Recognised for F.R.C.S. Tenable for 6 months.

Clacton and District Hospital, Clacton-on-Sea, Essex (58 Beds)

Post of SENIOR HOUSE OFFICER. Busy general hospital with regular outpatient sessions in all major specialties. Duties include medical, surgical, and casualty work, and the appointment offers practical all-round experience particularly useful to those entering general practice. Post tenable for 6 months or 1 year.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

COLWYN BAY AND WEST DENBIGHSHIRE HOSPITAL, COLWYN BAY. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER to the above Hospital of 60 Beds. The Hospital caters for major surgical, orthopædic and medical cases, and there is a small children's ward. Consultants in these specialties visit daily. A comfortably self-contained furnished flat is available. The post offers excellent experience for a suitably qualified candidate (married or single) who is contemplating entering general practice. The post will be vacant on 1st January, 1959.

Applications, with recent testimonials, should be addressed to WILLIAM ROBERTS, Esq., Group Secretary, Clwyd and Deeside Hospital Management Committee, Rhianfa, Russell-road, Rhyl.

CHICHESTER. ROYAL WEST SUSSEX HOSPITAL. (202 acute Beds.) RESIDENT HOUSE SURGEON required for 6-month appointment. National salary scales for either provisionally or fully registered practitioners. Post approved for pre-registration practitioners, and F.R.C.S. 8 residents. Vacant 14th January, 1959.

Applications, stating age, experience, qualifications, with references or names of referees, to Senior Administrative Officer.

CHICHESTER. ST. RICHARD'S HOSPITAL. Chichester GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of MEDICAL REGISTRAR, resident or non-resident, mainly at St. Richard's Hospital (400 Beds). Post vacant mid-February, 1959. Registrar will have care of 100 acute medical and pædiatric beds under the supervision of the Consultant Physicians and Pædiatrician, and will also assist the Consultant Neurologist, Chest Physician and Thoracic Surgeon. Salary according to terms and conditions of service of hospital medical staff. Candidates may visit the Hospital.

Forms from Group Secretary, 174, Broyle-road, Chichester, to be submitted within 14 days.

CHICHESTER. ST. RICHARD'S HOSPITAL. Chichester GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE PHYSICIAN at St. Richard's Hospital (400 Beds). Duties include care of general medical and pædiatric beds and special duties on the Medical and Surgical Thoracic Unit. Post vacant mid-January.

Applications, stating age, qualifications and experience, and giving names of 2 persons to whom reference may be made, should be sent to the Administrative Officer.

CHICHESTER. ST. RICHARD'S HOSPITAL. Chichester Group Hospital Management Committee. Applications are invited for 2 HOUSE SURGEONS (recognised for pre-registration) for 6 months in the first instance. Posts vacant beginning and middle of February, 1959. Principally general surgery with some orthopaedic and traumatic surgery. Hospital recognised for F.R.C.S.

Applications, stating age, qualifications and experience, giving names of 2 persons from whom reference may be obtained, should be sent to the Administrative Officer.

DENBIGH. THE NORTH WALES HOSPITAL FOR nervous and mental disorders. SENIOR HOUSE OFFICER required. The Hospital has modern treatment facilities, and is recognised by the Conjoint Board for the purpose of their D.P.M. examination. Flat available suitable for married couple without family.

Applications, with names of 2 referees, to the Medical Superintendent.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) HOUSE SURGEON (pre-registration) or SENIOR HOUSE OFFICER (general surgery). Resident. 2 vacancies December. Recognised F.R.C.S. if held by Senior House Officer.

Apply, giving full details, and 2 names for reference, to Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) HOUSE PHYSICIAN (pre-registration) or SENIOR HOUSE OFFICER (general medicine). Vacant early January.

Apply, stating full details, with copies of 2 testimonials, to Secretary.

DONCASTER ROYAL INFIRMARY (330 Beds). WES-TERN HOSPITAL, DONCASTER (241 Beds). (Post recognised for M.R.C.O.G.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (obstetrics and gynæcology) required 2nd January, 1959. Gynæcology beds at both hospitals; maternity unit at Western Hospital. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 29th December, 1959, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DORKING GENERAL HOSPITAL, Dorking, Surrey. Applications invited for post of SENIOR HOUSE OFFICER (general surgery, casualty, E.N.T.), vacant 1st February, 1959. Recognised for F.R.C.S. Married quarters available.

Apply, with testimonials, to Medical Superintendent.

DOUGLAS. NOBLE'S ISLE OF MAN HOSPITAL. (160 Beds.) Applications are invited for pre-registration post of HOUSE SURGEON. Salary in accordance with Whitley scale. 4 residents on staff. Post vacant mid-January.

Apply to the Secretary, Noble's Hospital, Douglas, Isle of Man.

DRIFFIELD, YORKSHIRE. EAST RIDING GENERAL HOSPITAL. (247 Beds.) SENIOR HOUSE SURGEON (Senior House Officer grade). Vacant beginning January. Good general experience, duties include general surgery with some gynæcology.

Detailed applications to Group Secretary, Westwood Hospital, Beverley, Yorkshire.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP, BIRMINGHAM REGION.

The Guest Hospital, Dudley (154 Beds)

SENIOR HOUSE OFFICER (anæsthetics). Post recognised for F.F.A. R.C.S. and D.A. Successful candidate will be required to visit other hospitals in the Group.

Applications, giving the names of 2 referees, to the Group Secretary, Guest Hospital, Dudley, Worcs.

HOUSE OFFICER (surgical), pre-registration. Post vacant now.

The Corbett Hospital, Stourbridge (114 Beds)

HOUSE OFFICER (surgical), pre-registration. Post vacant January, 1959.

HOUSE OFFICER (medical), pre-registration. Post vacant January, 1959.

Wordsley Hospital, near Stourbridge (478 Beds)

HOUSE OFFICER (surgical), pre-registration. Post now vacant.

HOUSE OFFICER (medical), pre-registration. Post vacant January, 1959.

Apply Group Secretary, Guest Hospital, Dudley, Worcs.

DUMFRIES AND GALLOWAY ROYAL INFIRMARY. SENIOR HOUSE OFFICER in Anæsthetics required at above Infirmary, which is recognised as a training hospital for the D.A.

Applications, with particulars of posts previously held, to be sent to Secretary, Dumfries and Galloway Royal Infirmary, Dumfries.

DURHAM. DRYBURN HOSPITAL. (310 Beds.)

HOUSE SURGEON (general surgery). Approved pre-registration appointment. Post vacant 1st February, 1959.

HOUSE PHYSICIAN (general medicine). Approved pre-registration appointment. Post vacant 1st February, 1959.

Apply, with names and addresses of 2 referees, to Group Secretary, Dryburn Hospital, Durham.

EAST GRINSTEAD, SUSSEX. QUEEN VICTORIA HOSPITAL (Plastic Surgery and Jaw Injuries Centre). TUNBRIDGE WELLS GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for resident appointment of SENIOR HOUSE OFFICER in Anæsthetics, vacant 1st February, 1959. Duties in anæsthesia for both general and plastic surgery. Post recognised for examinations of D.A. and F.F.A. R.C.S.

Apply, stating qualifications, experience, age, and names of 3 referees, to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells, as soon as possible.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (647 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Locum Tenens SENIOR REGISTRAR in Diagnostic Radiology required for an indefinite period from 10th January, 1959, at above Hospital. Whole-time services preferred, but part-time offer will be considered.

Apply immediately to the Medical Administrator.

EDGWARE GENERAL HOSPITAL. Junior Hospital MEDICAL OFFICER, non-resident, required in the Casualty Department at Edgware General Hospital (704 Beds).

Apply, stating age, nationality, qualifications, and giving details of experience, together with the names and addresses of 2 referees, to Group Secretary, Edgware General Hospital, Edgware, Middlesex, by 3rd January, 1959.

EDINBURGH. PRINCESS MARGARET ROSE ORTHO-PÆDIC HOSPITAL. Applications are invited from registered medical practitioners for appointments of 6 months' duration from 1st April, 1959, as SENIOR HOUSE OFFICERS (resident) in the above Hospital. Duties may include both adult and child patients. National Health Service scale.

Applications, stating age, qualifications and experience, and the names of 2 referees, to be sent to the Secretary, Edinburgh Central Hospitals, 1, Rillbank-terrace, Edinburgh, 9.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT HOUSE SURGEONS (pre-registration). 2 required. Fully registered practitioners will be considered. Vacant mid-February. General surgical duties with some orthopædics. Both posts recognised for the F.R.C.S. 6 months' appointment.

Apply, with the names and addresses of 2 referees, to the Group Secretary, Enfield Group Hospital Management Committee.

EPPING. ST. MARGARET'S HOSPITAL. Locum Tenens REGISTRAR (anæsthetics) required for 1–2 months.

Please write or telephone the Hospital Secretary, St. Margaret's Hospital, Epping (telephone Epping 2224).

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE OFFICER (obstetrics and gynæcology) required end of January. Pre-registration post. Recognised in obstetrics by the College for M.R.C.O.G. and D.Obst.R.C.O.G. purposes.

Applications, stating age, qualifications and experience, with copies of 2 recent testimonials, should be sent as soon as possible to Group Secretary at above address.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE PHYSICIAN required 1st February. Pre-registration post.

Applications, stating age, qualifications and experience, with copies of 2 recent testimonials, should be sent as soon as possible to Group Secretary at above address.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE PHYSICIAN required 1st February. Fully registered post. Duties at above Hospital and Annexes include general medicine, geriatrics, pædiatrics, and dermatology.

Applications, stating age, qualifications and experience, with copies of 2 recent testimonials, should be sent as soon as possible to Group Secretary at above address.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. (322 Beds.) Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER (anæsthetics). Resident or non-resident. Vacant 4th February, 1959. The post is recognised for the F.F.A. R.C.S. examination.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 3rd January, 1959.

GREAT YARMOUTH AND GORLESTON GENERAL HOSPITAL, DENE SIDE, GREAT YARMOUTH. (134 Beds.) Applications are invited for the appointments, vacant 26th January, 1959, of HOUSE SURGEONS (2). Male or Female. House Officer or Senior House Officer status. Posts recognised for pre-registration service. Opportunity for obstetric experience. Membership of a Medical Defence Society is a condition of appointment.

Applications, giving full details, together with names of 2 referees, to Hospital Secretary.

HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.) HOUSE PHYSICIAN required. Post vacant 1st January, 1959.

Apply to Secretary, Royal Halifax Infirmary, Halifax.

HALIFAX. ROYAL HALIFAX INFIRMARY. (301 Beds.) HOUSE SURGEON required for E.N.T./Eye duties. Post vacant now.

Apply to Secretary, Royal Halifax Infirmary, Halifax.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (146 Beds.) Applications are invited for the pre-registration post of HOUSE SURGEON for General Surgical and Urological Surgery. The Hospital is the main surgical unit in the Group with a resident staff of 4. The post is recognised for F.R.C.S., for which it offers excellent experience. The appointment is for 6 months and falls vacant in mid-January.

Applications, stating age, nationality, qualifications and experience, with copies of 3 recent testimonials, or the names of 2 referees, should be submitted to the Administrator by 29th December, 1958.

HASTINGS. ST. HELEN'S HOSPITAL. (491 Beds.) HOUSE SURGEON required. Pre-registration post, recognised for F.R.C.S. Resident staff of 5. Now vacant.

Applications immediately to Hospital Administrator.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of RESIDENT CASUALTY OFFICER (Senior House Officer grade) with attachment to Pædiatrician and Ophthalmic Consultant. Salary £819 10s. p.a., less £150 p.a. residential emoluments. Recognised under F.R.C.S. regulations. Appointment to commence 22nd December, 1958. Applicants offering short-term locum periods considered.

Apply, with full details and references, to Group Secretary, Hertford Hospital Management Committee, Hertford County Hospital, Hertford, Herts.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON, General (first or second post), to commence 19th January, 1959. Pre-registration post, recognised under F.R.C.S. regulations. Applications will also be considered from fully registered practitioners.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON (general surgery, gynaecology and obstetrics) (first or second post). To commence 22nd December, 1958. Pre-registration post, recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. 2 HOUSE SURGEONS (pre-registration) required. Posts vacant January.

Applications, giving full details and 2 names for reference, should be sent to the Hospital Secretary as soon as possible.

HEMEL HEMPSTEAD. ST. PAUL'S AND WEST HERTS HOSPITALS. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Clinical Pathology required at above Hospitals. Post now vacant. Hospitals may be visited by direct appointment.

Application form obtainable from and returnable to Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Hertfordshire.

HOUNSLOW HOSPITAL, Staines-road, Hounslow, Middlesex. (75 Beds-general acute.) STAINES GROUP HOSPITAL MANAGEMENT COMMITTEE. Locum RESIDENT SURGICAL REGISTRAR required for 4 weeks from Monday, 5th January, 1959.

Applications to the Secretary.

HUDDERSFIELD. MILL HILL HOSPITAL. (164 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer grade), £852 10s.–£55–£1182 10s. p.a., at the above Hospital. The present allocation of beds is 28 for infectious diseases and 136 for geriatric patients.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Group Secretary,
Huddersfield Hospital Management Committee.

The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duty immediately. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Group Secretary,
Huddersfield Hospital Management Committee,

The Royal Infirmary, Huddersfield.

HUDDERSFIELD ROYAL INFIRMARY. Huddersfield HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from provisionally registered medical practitioners for the post of HOUSE SURGEON to the Princess Royal Maternity Home (57 Beds) to commence duty on 1st February, 1959. The holder of the post, which is recognised for the D.Obst.R.C.O.G., will have access to the abnormal maternity and gynaecological beds at The Royal Infirmary. The Department is under the control of 2 Consultant Obstetricians and Gynaecologists. Salary in accordance with national scale.

Applications, with copies of 3 recent testimonials, to be addressed to the undersigned.

H. J. JOHNSON, Secretary to the Management Committee.
The Royal Infirmary, Huddersfield.

HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIAN. Paediatric Unit. Duties at Victoria Children's Hospital for 3 months followed by 3 months on the paediatric wards, Western General Hospital. An interesting and varied post which includes outpatient and casualty work. This appointment, which commences on 1st February, 1959, is recognised for the D.C.H.

Apply, giving experience, testimonials, &c., to the Secretary, Victoria Hospital for Sick Children, Park-street, Hull.

ILFORD. KING GEORGE HOSPITAL, Eastern-avenue, ILFORD, ESSEX. There will be a vacancy for a HOUSE PHYSICIAN at above Hospital on 23rd January, 1959. First or second post pre-registration. The post will be tenable for 6 months.

Applications, giving full particulars and accompanied by testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary,
Ilford and Barking Group
King George Hospital. Hospital Management Committee.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. House PHYSICIAN, General Medical Unit. Vacant 5th February, 1959. Pre-registration.

Applications, stating age, nationality, qualifications and experience, to Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, Middlesex, by 30th December, 1958.

IPSWICH. ST. HELEN'S HOSPITAL. (129 Beds for infectious diseases, pulmonary tuberculosis, long-stay orthopaedics and geriatrics. The area Chest Clinic is in the Hospital.) HOUSE PHYSICIAN required (Senior House Officer grade). Accommodation available for married man.

Applications to JOHN WILLIAMS, Group Secretary, Ipswich Group Hospital Management Committee, at Broughton House, Broughton-road, Ipswich.

IPSWICH AND EAST SUFFOLK HOSPITAL (Anglesea-ROAD WING). (350 Beds.) Applications invited for SENIOR HOUSE OFFICER to Fracture and Orthopaedic Department. Post recognised for F.R.C.S. examinations. The Department has about 60 Beds and a large outpatient attendance, offering wide experience.

Applications, stating age, nationality and experience, together with copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL (Heath-ROAD WING). (280 Beds.) HOUSE SURGEON (pre-registration) to General Surgeons.

Applications, with full details and copies of 3 recent testimonials, to Hospital Secretary.

KETTERING AND DISTRICT GENERAL HOSPITAL, NORTHAMPTONSHIRE. Applications are invited for the post of HOUSE SURGEON (pre-registration) vacant now. Post recognised for F.R.C.S.

Applications, stating age, experience and qualifications, together with copies of 3 recent testimonials, to be sent to the Group Secretary at the above address.

KETTERING GENERAL HOSPITAL, Kettering. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER in Paediatrics, vacant 1st January, 1959. Post recognised for D.C.H.

Applications, together with copies of 3 recent testimonials, should be sent to the Group Secretary as soon as possible.

KETTERING GENERAL HOSPITAL, Kettering. (144 Beds.) Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER in Anaesthetics, vacant now. Post recognised for D.A.

Applications, giving details of qualifications and experience, and enclosing copies of 3 recent testimonials, to be sent to the Group Secretary, Kettering and District Hospital Management Committee, at the above address.

KIDDERMINSTER AND DISTRICT GENERAL HOSPITAL, WORCESTERSHIRE. Applications are invited for the pre-registration post of HOUSE PHYSICIAN at the above Hospital. Post vacant January, 1959.

Applications, with the names of 3 referees, to the Hospital Secretary.

KIDDERMINSTER AND DISTRICT GENERAL HOSPITAL, WORCESTERSHIRE. Applications are invited for the pre-registration post of HOUSE SURGEON at the above Hospital. Post vacant January, 1959.

Applications, with the names of 3 referees, to the Hospital Secretary.

LEEDS REGIONAL HOSPITAL BOARD. Senior Registrar vacancies.

Infectious Diseases

The duties of this post are mainly at Seacroft (Infectious Diseases) Hospital, Leeds (140 infectious diseases beds with a high average occupancy). The post will be resident, and previous experience in infectious diseases is essential.

Pathology

Duties at the Regional Transfusion Centre, Seacroft, with minor relief duties in General Pathology at St. James's Hospital, Leeds. Over 60,000 bottles of blood taken annually. Previous experience in all branches of pathology desirable. Non-resident.

Psychiatry

Duties initially at Scalebor Park Hospital, Burley-in-Wharfedale, Ilkley (396 Beds), and associated hospitals. This Hospital, which has a large proportion of amenity beds, has a high admission rate and active treatment policy and is associated with the Department of Psychiatry, University of Leeds. This post is included in a scheme which is designed to provide maximum facilities for advanced study and training and the person appointed may be seconded at a later date to another hospital within the Region in order to gain further experience. At present there is accommodation at this Hospital for a single person, but the provision of married accommodation at a future date is being considered. Candidates for this appointment must hold the D.P.M. or equivalent qualification.

Applications, stating age, qualifications, and details of present and previous appointments, with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 30th December, 1958.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. Applications are invited for the post of REGISTRAR in the Department of Psychiatry (Leeds University) to work at the General Infirmary at Leeds. Some previous experience of psychiatry necessary. Opportunities are available for study for a higher degree.

Applications, including 3 names for reference, to be sent to the Sub-Dean, The School of Medicine, Leeds, 2, not later than 1st January, 1959.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. Applications are invited for the post of HOUSE SURGEON (pre-registration) to the Genito-urinary Department. Applications will be considered from candidates who have completed pre-registration, in which case the post will be paid at Senior House Officer level.

Applications, stating age, qualifications, experience, and 3 names for reference, to be sent to the Secretary to the Board, The General Infirmary, Leeds, 1, as soon as possible.

LEEDS. THE UNITED LEEDS HOSPITALS. The GENERAL INFIRMARY AT LEEDS. REGISTRAR in Urology required for a period of 1 year in the first instance. Renewable for second year. Post offers good experience either to candidates having already embarked upon training in general surgery or to those who wish to specialise in urology. Whitley conditions of service apply.

Applications, stating age, experience, qualifications, previous posts, with dates, and 3 names for reference, should be sent to the Sub-Dean, The Medical School, Leeds, 2, by not later than 1st January, 1959.

LEICESTER GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER to the Surgical Department (240 Beds), vacant 4th February, 1959. The appointment is tenable for 12 months, and is recognised for the F.R.C.S. It consists of 6 months General Surgery and 6 months in the special departments of Orthopaedics, Plastic Surgery and E.N.T.

Applications, with copies of 3 recent testimonials, to Group Secretary, Leicester No. 1 Hospital Management Committee, The Leicester Royal Infirmary, by 3rd January.

LEICESTER ROYAL INFIRMARY. Applications are invited for the resident post of SENIOR HOUSE OFFICER to the E.N.T. Department, for a period of 12 months commencing 1st January. The post is recognised for the D.L.O. and F.R.C.S.

Applications, stating age, qualifications and experience, together with copies of recent testimonials, to the Group Secretary, No. 1 Hospital Management Committee, The Leicester Royal Infirmary, forthwith.

LICHFIELD. ST. MATTHEW'S HOSPITAL, Burntwood, LICHFIELD, STAFFORDSHIRE. (1330 mental beds.) BURTON-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (psychiatry) required. Resident accommodation available. This is a modern mental hospital undertaking all forms of treatment and providing facilities for taking the D.P.M.

Applications, with 2 references, to the Medical Superintendent.

LINCOLN COUNTY HOSPITAL, Sewell-road, Lincoln. (200 Beds.) Applications are invited from Men and Women for 2 posts of RESIDENT HOUSE SURGEON. These are approved pre-registration posts which will be vacant on 23rd January and 15th February, 1959, respectively. The duties are with General Surgeons. If satisfactory, candidates will be appointed for a second 6 months as House Physicians.

Applications, with copy testimonials, should be sent to the Group Secretary, Lincoln County Hospital, as soon as possible.

MACCLESFIELD HOSPITAL (Infirmary Branch). (100 Beds.) Pre-registration HOUSE OFFICER in Surgery. Acute Surgical Unit of 100 Beds. Recognised for F.R.C.S. purposes. Main casualty duties undertaken by Senior Resident Practitioner.

Apply immediately to Group Secretary, Macclesfield and District Hospital Management Committee, Willerby House, Cumberland-street, Macclesfield, together with names and addresses of 2 referees.

MANCHESTER. BAGULEY HOSPITAL. (402 Beds.) SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in Chest Diseases. This Hospital is a large Thoracic Unit fully equipped for the medical and surgical treatment of tuberculosis and other chest diseases. Attached to the Hospital is a Chest Clinic. The post offers opportunities for wide experience in medical and surgical treatment of patients suffering from tuberculosis and other diseases of the chest, together with chest clinic work. Ample scope for clinical research.

Applications, stating age, qualifications, nationality, experience, and the names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

MANCHESTER REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR required 15th February, 1959, in the Blackburn and District Group with duties mainly at Queen's Park Hospital, Blackburn (640 mainly general beds). Post recognised for F.R.C.S. A furnished house will be available, on rental, for a married man.

Application forms obtainable from the Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn, Lancs.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for the post of RESIDENT SURGICAL OFFICER (Registrar grade).

Application forms may be obtained from the undersigned.

H. R. NORTH,
General Superintendent, Manchester Royal Eye Hospital.

MANCHESTER VICTORIA MEMORIAL JEWISH HOSPITAL. (Non-sectarian—104 Beds.) Applications are invited for the resident post of SENIOR HOUSE OFFICER in Surgery, to act as Deputy Resident Surgical Officer. Recognised for F.R.C.S. Vacant 28th January, 1959.

Applications, quoting Lan 2, with names of 2 referees, by 29th December, 1958, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. ECCLES AND PATRICROFT HOSPITAL, ECCLES. (General Hospital—47 Beds.) RESIDENT SENIOR HOUSE OFFICER required. The work of the Hospital is mainly surgical and there is a busy Casualty Department. The person appointed will be 1 of 2 resident Senior House Officers.

Applications, giving full details, together with names and addresses of 2 referees, to Group Secretary, Park Hospital, Davyhulme, Manchester.

MANCHESTER, 23. WYTHENSHAWE HOSPITAL, SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered practitioners for the post of SENIOR HOUSE OFFICER in E.N.T. Surgery with duties at Wythenshawe and Withington Hospitals.

Applications, with the names of 2 referees, to be submitted to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON, 6 months' appointment. Vacant 3rd January, 1959. Recognised for F.R.C.S. Salary at the rate of £467 10s.–£577 10s. p.a. A deduction at the rate of £125 a year is made for board and lodging, and other services provided.

Applications should be forwarded, as soon as possible, to the Administrative Officer at the Hospital.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE PHYSICIAN, 6-month appointment. Post vacant mid-February, 1959. Salary at the rate of £467 10s.–£577 10s. p.a. A deduction at the rate of £125 a year is made for board and lodging, and other services provided.

Applications should be forwarded, as soon as possible, to the Administrative Officer at the Hospital.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (141 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. CASUALTY OFFICER (Senior House Officer). Recognised for F.R.C.S. Salary £819 10s. a year, less £150 a year for board and lodging. Post vacant February, 1959.

Applications to the Administrative Officer at the Hospital.

MIDDLESBROUGH GENERAL HOSPITAL, Ayresome Green-lane, MIDDLESBROUGH. (305 Beds.) SOUTH TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (orthopedics) at the above Hospital. The post is recognised for the F.R.C.S. examination and includes some duties in the Casualty Department, which is under the supervision of a full-time Senior Casualty Officer.

Applications, stating age, qualifications and experience, together with 2 names for reference, should be sent to the Hospital Secretary as soon as possible.

MIDDLESBROUGH GENERAL HOSPITAL, Ayresome Green-lane, MIDDLESBROUGH. (305 Beds.) SOUTH TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (general surgery) at the above Hospital. The post is recognised for the F.R.C.S. examination and includes some duties in the Casualty Department which is under the supervision of a full-time Senior Casualty Officer.

Applications, stating age, qualifications and experience, together with 2 names for reference, should be sent to the Hospital Secretary.

MIDDLESBROUGH. HEMLINGTON HOSPITAL. South TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (surgery) at the above Hospital. The appointment is recognised for the F.R.C.S. examinations. The Hospital does not have a Casualty Department.

Applications, stating age, qualifications and experience, together with 2 names for reference, should be sent to the Hospital Secretary.

MIDDLESBROUGH. NORTH ORMESBY HOSPITAL. (184 Beds.) SOUTH TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (surgery) to Surgical Team No. 2 at the above Hospital. The post is recognised for pre-registration service.

Applications, stating age, qualifications and experience, together with 2 names for reference, should be sent to the Hospital Secretary.

MID-GLAMORGAN HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following posts falling vacant on 1st February, 1959:—

Neath General Hospital, Neath (412 Beds)
HOUSE SURGEONS.
HOUSE PHYSICIANS.
HOUSE SURGEONS (obstetrics and gynæcology).

Bridgend General Hospital, Quarella-road, Bridgend (381 Beds)
HOUSE SURGEONS.
HOUSE PHYSICIANS.
HOUSE SURGEONS (obstetrics and gynæcology).

These Hospitals are recognised for the major diplomas and approved by the General Medical Council for pre-registration service.

Applications, naming 2 referees, to be addressed to the Group Secretary of the Committee, 8, Wind-street, Neath.

MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT ANÆSTHETIST for joint duties at the West Kent General Hospital, and the Kent County Ophthalmic and Aural Hospital, Maidstone (total beds 254). The post, which is of Senior House Officer grade, carries a salary of £819 10s. a year less £150 for residential emoluments. Excellent experience under Consultant Anæsthetists is available, and the post is recognised for the F.F.A. R.C.S. examination.

Applications, stating age, nationality, qualifications and experience, together with the names of 2 suitable referees, should be forwarded to the Administrative Officer, West Kent General Hospital, Maidstone.

NEWCASTLE GENERAL HOSPITAL. Newcastle upon TYNE HOSPITAL MANAGEMENT COMMITTEE. Department of Neurological Surgery. Regional Unit. SENIOR HOUSE OFFICER. Post recognised for F.R.C.S. Now vacant, but applications from persons not able to commence until early January, 1959, will be considered.

Applications, together with names and addresses of 2 referees, should be sent to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4.

NEWCASTLE GENERAL HOSPITAL. (800 Beds.) SENIOR HOUSE OFFICER for Pediatric Department. The post, available in February, 1959, offers experience in the whole of the pediatric work of the Hospital, including general medicine and surgery and special departments. There is a close association with the University Department of Child Health.

Applications, with names and addresses of 2 referees, should be sent to the Secretary, Newcastle General Hospital, Newcastle upon Tyne, 4.

NEWTON ABBOT HOSPITAL. Resident Senior House SURGEON, Male or Female, required immediately, to act as Casualty Officer and House Surgeon to special departments, together with relief duties. Ability to give outpatient anæsthetics advantageous. Married quarters available.

Applications (quoting reference F.364/41), stating qualifications, nationality, age, with copy testimonials, to be sent to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, South Devon.

NUNEATON. MANOR HOSPITAL. Senior House Officer in Anæsthetics. Resident or non-resident. Recognised D.A., F.F.A. R.C.S.

Applications to Hospital Secretary.

NEWBURY DISTRICT HOSPITAL, Newbury, Berkshire. (90 Beds.) SENIOR HOUSE OFFICER (mainly general surgery with some casualty). Post vacant 1st March, 1959. A ground-floor flat, suitable for a married person, is available.

Applications, giving full details, with 3 names for reference, to Group Secretary, Reading and District Hospital Management Committee, 3, Craven-road, Reading.

NORWICH. UNITED NORWICH HOSPITALS. Applications are invited for the following appointments vacant 1st February, 1959. All are pre-registration posts:—

(1) **Norfolk and Norwich Hospital, Norwich**

HOUSE SURGEON (2). Post recognised for final F.R.C.S. examination requirements. Duties entirely general surgical.

JUNIOR CASUALTY OFFICER. 2 Casualty Officers employed in the department.

OBSTETRIC HOUSE SURGEON. 2 House Officers employed in the department.

JUNIOR ORTHOPÆDIC HOUSE SURGEON. 2 Orthopædic House Officers employed in the department.

(2) **Jenny Lind Hospital for Children, Norwich**

HOUSE SURGEON at this Hospital which forms the entire Paediatric Department of the United Norwich Hospitals. The duties are under the direct supervision of the Consultant staff of the Norfolk and Norwich Hospital.

(3) **West Norwich Hospital, Norwich**

HOUSE PHYSICIAN. Duties include medical and geriatrics. The beds at this Hospital are under the control of the Consultant Physicians of the Norfolk and Norwich Hospital, and the successful candidate will be required to undertake medical duties under their supervision.

HOUSE SURGEON (2). Post recognised for final F.R.C.S. examination requirements. Duties general surgical and including burns and plastic work. The beds at this Hospital are under the control of the Consultant staff of the Norfolk and Norwich Hospital.

(4) **Norfolk and Norwich Hospital, Norwich**

Applications are also invited for the following appointments vacant 1st February, 1959:—

SENIOR OBSTETRIC HOUSE SURGEON. Senior House Officer status. 2 House Officers employed in the department. Post recognised for final D.Obst.R.C.O.G. examination requirements.

SENIOR ORTHOPÆDIC HOUSE SURGEON. Senior House Officer status. 2 Orthopædic House Officers employed in the department. Post recognised for final F.R.C.S. examination requirements.

Membership of a Medical Defence Society is a condition of appointment in each case.

Applications, giving full details with names of 2 referees, to Group Secretary, Hospital Management Committee, St. Stephen's-road, Norwich, by 5th January, 1959.

NOTTINGHAM CHILDREN'S HOSPITAL. (136 Beds. Recognised for the D.C.H.) Applications are invited for the post of SENIOR HOUSE OFFICER (surgical) which will be vacant early January. The post is tenable for 6 months or a year by agreement.

Applications, with copies of 2 testimonials, should be sent to the Secretary, Nottingham Children's Hospital, Chestnut-grove, Nottingham.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) Applications are invited for the post of HOUSE SURGEON (pre-registration)/SENIOR HOUSE OFFICER, vacant 1st February, 1959.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) Applications are invited for the post of RESIDENT PATHOLOGIST (Senior House Officer). Previous experience an advantage. Post vacant 1st January, 1959.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM CITY HOSPITAL. (811 Beds.) **Sheffield** REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT REGISTRAR (thoracic surgery) required immediately. Appointment for 1 year in first instance. Thoracic Unit at City Hospital undertakes non-tuberculous and cardiological cases; tuberculosis surgery undertaken at modern unit in nearby sanatorium, appointee encouraged to attend. Previous thoracic surgical experience desirable.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 29th December, 1958, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

NOTTINGHAM EYE HOSPITAL. Senior House Officer (ophthalmology) required. Duties to commence on 23rd December, 1958. Salary and conditions of service in accordance with Ministry regulations.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM. FIRS MATERNITY HOSPITAL. (40 Beds.) Required RESIDENT SENIOR HOUSE OFFICER (obstetrics), post vacant early February, 1959. Recognised for D.Obst.R.C.O.G. Previous experience in obstetrics an advantage.

Applications, with copies of 3 testimonials, to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Pre-registration HOUSE SURGEONS required. Duties to commence end January/beginning February, 1959.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Senior House OFFICER (anæsthetics) required about 1st January, 1959. The post is recognised for the D.A. and the F.F.A. R.C.S. This is a busy general hospital, giving experience in all branches of surgery.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Senior House OFFICER (orthopædic and fracture) required. Duties to commence early January, 1959. Post offers exceptional experience in traumatic surgery.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Senior House OFFICER (surgery) required. Duties to commence about 19th January, 1959.

Applications, stating age, qualifications, experience and nationality, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Resident Pre-registration HOUSE PHYSICIANS required. Posts vacant mid-January, 1959, and early February, 1959.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. E.N.T. Department. A SENIOR HOUSE OFFICER (E.N.T.) required at the above Hospital. This post is recognised for the D.L.O. and F.R.C.S. examinations. Salary and conditions of service in accordance with Ministry regulations. Duties to commence as soon as possible.

Applications, stating age, qualifications, experience, and nationality, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (casualty). Duties to commence as soon as possible.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Secretary, General Hospital, Nottingham.

NOTTINGHAM. HIGHBURY HOSPITAL, Bulwell, NOTTINGHAM. SENIOR HOUSE OFFICER (surgical) required. Duties to commence 5th January, 1959. Good opportunity for suitable candidate to gain experience in operating. This post is an excellent one for candidate who wishes to sit for Final F.R.C.S. examination in the near future.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Hospital Secretary.

NOTTINGHAM. HIGHBURY HOSPITAL, Bulwell, NOTTINGHAM. Applications are invited from fully qualified medical practitioners for the post of SENIOR HOUSE OFFICER (obstetrics) in the Obstetrical and Gynæcological Departments (48 obstetrical beds 17 gynæcological beds, and a small block for puerperal pyrexia). This Hospital is recognised for training for the membership and diploma in obstetrics examinations. Duties to commence on 1st January, 1959. Preference will be given to candidates who have experience in obstetrics and gynæcology. Terms and conditions of service as laid down by the Ministry of Health.

Apply, stating age, qualifications, and experience, together with copies of testimonials, to Hospital Secretary.

OXFORD REGIONAL HOSPITAL BOARD. Registrar in Orthopædic and Accident Surgery to the Reading Group of hospitals. Recognised for the F.R.C.S. The appointment will be for 1 year and eligible for extension of 2 years.

Applications, on forms obtainable from the Secretary, Registrars Committee, 43, Banbury-road, Oxford, to reach him by 3rd January, 1959.

OXFORD REGIONAL HOSPITAL BOARD. Locum REGISTRAR in E.N.T. Surgery, Royal Berkshire Hospital, Reading, required from 26th January, 1959, for approximately 14 weeks.

Applications, stating the names of 2 referees, to Secretary, 43, Banbury-road, Oxford.

OXFORD. THE UNITED OXFORD HOSPITALS. The RADCLIFFE INFIRMARY. Applications are invited for the post of REGISTRAR/RESEARCH ASSISTANT to the Accident Service to commence on 14th January, 1959. The duties of this post will be divided equally between the clinical duties of the Registrar appointment, and research work in the Department, under the supervision of the Director of the Accident Service.

Applications, on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should be received as soon as possible.

OXFORD. UNITED OXFORD HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER in the Accident Service, Radcliffe Infirmary, commencing 1st February, 1959, for a period of 6 months.

Applications, stating age, qualifications and experience, together with 2 names for reference purposes, should be received by the Administrator, Radcliffe Infirmary, by 3rd January.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

HOUSE SURGEON, pre-registration post, vacant immediately. Devonport Section.

HOUSE SURGEONS, pre-registration posts, vacancies, 2 on 1st January, 1959. Freedom Fields Section.

HOUSE SURGEONS, pre-registration posts, vacancies, 1 immediately, and 9th January, 1959. Greenbank-road Section.

All posts are recognised for the F.R.C.S.

Apply with names of 3 referees, also stating age, nationality, qualifications and experience, to the Group Secretary, 7, Nelson-gardens, Plymouth.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, Greenbank-road, PLYMOUTH. HOUSE PHYSICIANS, pre-registration posts, vacancies 1st and 14th January, 1959.

Apply with names of 3 referees, also stating age, nationality, qualifications and experience, to the Group Secretary, 7, Nelson-gardens, Plymouth.

PLYMOUTH. SCOTT ISOLATION HOSPITAL. House PHYSICIAN (resident, Male), post vacant 9th January, 1959. Recognised pre-registration post which offers excellent experience.

Applications to the Group Secretary, Plymouth Special Hospital Management Committee, 8, Nelson-gardens, Stoke, Plymouth.

PLYMOUTH. SCOTT ISOLATION HOSPITAL. PLYMOUTH SPECIAL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER from Male registered medical practitioners who have preferably been qualified for 1 year, and have had previous hospital experience. The duties, in 2 departments, will be chiefly in connection with infectious and venereal diseases, the former including a substantial proportion of cases in children. The varied clinical work, including acute medical cases, provides valuable experience, particularly to those reading for a higher medical degree, or contemplating general practice. The appointment will be for 1 year, vacant on 1st January, 1959. There is accommodation for either a married or single candidate.

Applications, together with copies of 2 recent testimonials, should be sent to the Group Secretary, Plymouth Special Hospital Management Committee, 8, Nelson-gardens, Stoke, Plymouth.

PONTEFRACT GENERAL INFIRMARY. House Surgeon required. This is an approved pre-registration post under Medical Act, 1950, but applications will be considered from fully registered practitioners. Hospital approved under F.R.C.S. regulations and provides excellent surgical experience. Married accommodation available. Post vacant 19th December, 1958.

Applications as soon as possible to the Secretary, Pontefract and Castleford Hospital Management Committee, Great Northern House, Salter-row, Pontefract, Yorkshire.

POOLE GENERAL HOSPITAL, Poole, Dorset. (320 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Locum SENIOR RESIDENT SURGICAL OFFICER required from 29th December, 1958, to 7th January, 1959, inclusive.

Applications to the Hospital Secretary.

POOLE GENERAL HOSPITAL, Poole, Dorset. Bourne-MOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Locum REGISTRAR in Anæsthetics required from 29th December, 1958, to 11th January, 1959, inclusive.

Applications to the Hospital Secretary.

PORT TALBOT GENERAL HOSPITAL, Hospital-road, PORT TALBOT. (85 Beds.) MID-GLAMORGAN HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following vacancies:—

SENIOR HOUSE OFFICER (general surgery).

SENIOR HOUSE OFFICER (general medicine).

Applications, naming 2 referees, to be addressed to the Group Secretary of the Committee, 8, Wind-street, Neath.

PRESTON AND CHORLEY HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR in Pathology with main duties in haematology and blood transfusion. This post is in the newly completed Group Laboratory at Preston Royal Infirmary.

Applications forms available from Group Secretary, Royal Infirmary, Preston, Leeds.

PRESTON ROYAL INFIRMARY. Locum Senior House OFFICER in Casualty. Post vacant mid-December to mid-February.

Applications, with names of 2 referees, to Group Secretary, Preston and Chorley Hospital Management Committee, Royal Infirmary, Preston, Lancashire.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SURGICAL REGISTRAR with duties mainly at Saint Mary's Hospital (120 surgical beds). Vacant 1st January, 1959. The post will include duties in the Department of Thoracic Surgery (15 Beds). The successful candidate must hold the F.R.C.S.

Application forms, obtainable from the Group Secretary, Saint Mary's Hospital, Portsmouth, returnable by 22nd December, 1958. Canvassing will disqualify. Candidates may visit the Hospital by arrangement with the Group Secretary.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Saint Mary's Hospital (surgery—120 surgical beds)

HOUSE OFFICER (pre-registration). Vacant 30th January, 1959.

Royal Portsmouth Hospital (medical—61 medical beds)

HOUSE OFFICER (pre-registration). Vacant 19th January, 1959.

SENIOR HOUSE OFFICER required in Orthopædic Department (104 orthopædic beds). Vacant now.

ORTHOPÆDIC HOUSE OFFICER (pre-registration). Vacant now.

Queen Alexandra Hospital (medical—78 medical beds)

HOUSE OFFICER (pre-registration). Vacant 1st January, 1959.

Saint Mary's Hospital

SENIOR HOUSE OFFICER (anæsthetics). Vacant now. Post offers experience in most branches of anæsthesia, including thoracic surgery, midwifery, and respiratory poliomyelitis. 6 Consultant Anæsthetists practise in the Group.

SENIOR HOUSE OFFICER (obstetrics and gynecology) (82 obstetric and 50 gynæcological beds). Vacant now. Post recognised for M.R.C.O.G.

Applications, stating age, experience and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST, St. Mary's Hospital, Milton-road, Portsmouth.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of Locum SENIOR ANÆSTHETIC REGISTRAR in the Portsmouth Group. Post available approximately 26th January, 1959, for 2 months in first instance.

Applications in writing should reach the Group Secretary, Saint Mary's Hospital, Portsmouth, by 29th December, 1958.

REDHILL. EAST SURREY HOSPITAL, Shrewsbury-road, REDHILL, SURREY. Locum HOUSE PHYSICIAN required for 2 weeks from 27th December, 1958.

Apply to Hospital Secretary.

ROCHDALE AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. 2 HOUSE OFFICERS (surgery) required immediately for busy Surgical Units in Birch Hill Hospital and Rochdale Infirmary. These posts are recognised for F.R.C.S. qualification and offer excellent experience.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

ROCHDALE AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. ROCHDALE INFIRMARY. RESIDENT SENIOR HOUSE OFFICER (surgery) required. This post is recognised for F.R.C.S. qualification and offers excellent experience.

Apply at once to the Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

ROCHESTER. ST. BARTHOLOMEW'S HOSPITAL. MEDWAY AND GRAVESEND HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of CASUALTY OFFICER (Senior House Officer grade), (1 of 2 in department) vacant January. Tenable for 6 or 12 months. Salary £819 10s. less £150.

Applications, stating age, nationality, qualifications and experience, with recent testimonials, to the Hospital Secretary.

ROCHFORD GENERAL HOSPITAL, Essex. (620 Beds.) RESIDENT SENIOR HOUSE OFFICER required to work in the Chest Unit (72 Beds) at the above Hospital and at the Lancaster House Chest Clinic, Southend-on-Sea, to commence approximately mid-January. Good experience in general medicine essential, and previous experience in tuberculosis and diseases of the chest desirable.

Applications, stating age, &c., to the Secretary by 27th December, 1958.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. Resi-DENT PATHOLOGIST (Senior House Officer grade). This post, now vacant, provides valuable experience by rotation through all departments of this large Group Laboratory and is recognised for the purposes of the Diploma in Pathology. Prospective candidates are invited to visit the laboratory.

Applications should be sent, with testimonials or the names of 2 referees, as soon as possible to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER required from 19th January, 1959, in the Obstetric and Gynæcological Unit consisting of 88 obstetric and 52 gynæcological beds. Post recognised for the D.Obst.R.C.O.G. and M.R.C.O.G.

Applications should be addressed to the Secretary, Romford Group Hospital Management Committee, at the Hospital as soon as possible.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. (301 Beds.) RESIDENT GYNÆCOLOGICAL AND OBSTETRIC HOUSE SURGEON (preferably Female) required from 27th January, 1959. Post recognised for pre-registration (surgical). Qualified medical practitioners may apply. Unit comprises 35 gynæcological and 6 obstetric beds for abnormal midwifery (about 200 deliveries per year).

Applications should be addressed immediately to the Medical Superintendent, stating names of 2 referees.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. (301 Beds.) RESIDENT HOUSE PHYSICIAN (Male or Female) required from 23rd January, 1959. This Hospital provides for acute medical, surgical and infectious patients. The post, which is also open to pre-registration candidates, offers good opportunities for gaining experience in both fevers and general medicine.

Applications should be addressed immediately to the Medical Superintendent, stating names of 2 referees.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. (301 Beds.) RESIDENT HOUSE OFFICER (general surgery), Male or Female, required from 6th January, 1959. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications should be forwarded immediately to Medical Superintendent, stating also names of 2 referees.

RUSTINGTON, SUSSEX. ZACHARY MERTON MATER-NITY HOSPITAL. (54 Beds.) WORTHING GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for a RESIDENT HOUSE OFFICER (preferably Female) post vacant 24th January, 1959. Salary £467 10s.–£577 10s. p.a., according to experience, less £125 p.a. for emoluments.

Applications to be submitted to the undersigned immediately.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.
129, Brighton-road, Worthing, Sussex.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE PHYSICIAN for a period of 6 months from 19th February, 1959. Post open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SCUNTHORPE. WAR MEMORIAL HOSPITAL. (262 Beds.) Vacancy end of January for HOUSE PHYSICIAN (resident), Senior House Officer/pre-registration, busy department with general medicine, pediatrics, skins, and eyes, large outpatient clinics all offering good opportunity for acquiring experience.

Applications, naming 2 referees, to Group Secretary, Scunthorpe Hospital Management Committee.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment, which will be for 1 year in the first instance, of REGISTRAR in Obstetrics and Gynæcology at Robroyston Hospital and the Royal Samaritan Hospital for Women, Glasgow, and on a yearly rotational basis at the Royal Infirmary and the Rankin Memorial Hospital, Greenock. Appointment will be to the Greenock hospitals in the first instance.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 3rd January, 1959.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLANDS HOSPITAL. (411 Beds.) HOUSE SURGEON, post recognised by R.C.S. for Fellowship; entails duties in general surgery and orthopædics; vacant 1st January.

Applications to Secretary, Southlands Hospital.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

SHOREHAM-BY-SEA, SUSSEX. SOUTHLANDS HOSPITAL. (411 Beds.) Locum SURGICAL REGISTRAR for an indefinite period from 27th December, 1958.

Apply Hospital Secretary, Southlands Hospital, as soon as possible. A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

SHEFFIELD, 5. CITY GENERAL HOSPITAL. Applications are invited for the resident post of HOUSE PHYSICIAN (pædiatrics) (Intern or Senior House Officer). Vacant 15th January, 1959. Recognised for D.C.H.

Apply, giving full details of qualifications, past and present appointments, and the names of 2 persons for reference, to the Group Secretary, Sheffield No. 1 Hospital Management Committee, Lyndhurst, Nether Edge Hospital, Sheffield, 11.

SHEFFIELD NO. 4 HOSPITAL MANAGEMENT COMMITTEE. SHEFFIELD REGIONAL HOSPITAL BOARD. Radiotherapy Services. Medical Men and Women desirous of taking up radiotherapy are invited to apply for the post of RESIDENT RADIOLOGICAL OFFICER at Sheffield. The appointment will have the status of a Senior House Officer on a salary of £819 10s. p.a. Approved courses for the D.M.R.T. (R.C.P. & S.) are held at the Sheffield National Centre for Radiotherapy and will be open to the successful candidate, facilities being given to attend these. Should the appointee hold a high medical qualification or be in possession of the D.M.R.T. or have passed Part I of the examination for the Diploma, his status will be that of Registrar.

Applications for further particulars should be addressed to the Secretary, Broom Cross, Tree Root Walk, Sheffield, 10.

SHREWSBURY. ROYAL SALOP INFIRMARY. CHILDREN'S UNIT. Locum SENIOR HOUSE OFFICER or HOUSE OFFICER (pædiatric) required 12th–25th January, 1959.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY AND COPTHORNE HOSPITAL. (500 Beds.) RESIDENT ANÆSTHETIST (Senior House Officer). Post recognised for F.F.A. R.C.S. Registrar also employed. Vacant 24th January, 1959.

Applications and copy testimonials to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SHREWSBURY. ROYAL SALOP INFIRMARY AND COPTHORNE HOSPITAL. (500 Beds.) SENIOR HOUSE OFFICER (gynæcological). 50 gynæcological beds and 2 House Surgeons. Posts recognised for M.R.C.O.G. Vacant early January, 1959.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

AMENDED ADVERTISEMENT

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Anæsthetics to fill a vacancy in the Bromley Group of hospitals. This post is recognised for the F.F.A. R.C.S. and the D.A. examinations, a fact which was omitted in error from the advertisement which appeared on 29th November, 1958. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 40, Eastbourne-terrace, London, W.2, not later than 31st December, 1958.

SOUTHEND. GENERAL HOSPITAL. (262 Beds.) HOUSE SURGEON (pre-registration) required. Post now vacant.

Applications, stating age, qualifications and previous experience, with copies of recent testimonials (1 testimonial sufficient from applicants for first appointment), should reach the Secretary as soon as possible.

SOUTHAMPTON CHILDREN'S HOSPITAL. (Recognised by Conjoint Board for D.C.H.). HOUSE OFFICER required. Total establishment of 3 Residents. Salary, &c., as nationally advocated.

Applications, with copies of testimonials, to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON GENERAL HOSPITAL. (465 Beds. Recognised for F.R.C.S.) RESIDENT HOUSE SURGEON required. Pre-registration candidate eligible.

Applications should be forwarded to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton, with copies of recent testimonials.

SOUTHAMPTON GENERAL HOSPITAL. (465 Beds.) RESIDENT HOUSE PHYSICIAN required mid-January. Pre-registration candidates eligible.

Applications, with copies of testimonials, to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON GENERAL HOSPITAL. (465 Beds. Recognised for the Membership and Diploma Examinations of the R.C.O.G.) RESIDENT HOUSE SURGEON (pre-registration) to the Gynæcological and Obstetric Unit required mid-January.

Applications, with copies of recent testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY. (175 Beds—Recovery Unit 32 Beds.) HOUSE SURGEON. Pre-registration post. Vacant January. At end of service the successful applicant will be considered for pre-registration post of House Physician if he or she has not held such an appointment.

Applications to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY. RESIDENT CASUALTY OFFICER required. Junior Hospital Medical Officer status.

Applications, with names for reference, to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

STIRLING AND CLACKMANNAN HOSPITALS BOARD OF MANAGEMENT. The following vacancy exists for a Resident House Officer from 1st February, 1959:—

Airthrey Castle Maternity Hospital
HOUSE SURGEON.
This is a pre-registration post.

Applications should be sent to the Group Medical Superintendent, Stirling Royal Infirmary.

STIRLING AND CLACKMANNAN HOSPITALS BOARD OF MANAGEMENT. The following vacancies exist for Resident House Officers from 1st February, 1959:—

Stirling Royal Infirmary
3 HOUSE SURGEONS.
These are pre-registration posts.

Applications should be sent to the Group Medical Superintendent, Stirling Royal Infirmary.

STIRLING AND CLACKMANNAN HOSPITALS BOARD OF MANAGEMENT. The following vacancy exists for a Resident House Officer from 1st February, 1959:—

Clackmannan County Hospital
HOUSE SURGEON.
This is a pre-registration post.

Applications should be sent to the Group Medical Superintendent, Stirling Royal Infirmary.

ST. HELENS AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. The following Resident House Officer posts become vacant on 1st March, 1959:—

St. Helens Hospital (196 Beds)
HOUSE PHYSICIAN.
HOUSE SURGEONS (2).

Whiston Hospital, Prescot (892 Beds)
HOUSE PHYSICIANS (3).
HOUSE SURGEONS (2).

The above posts are recognised for pre-registration service. The surgical posts are recognised for the F.R.C.S. examinations.

Applications, stating age, date of qualifications and experience, and giving 2 names for reference, should be forwarded to the Group Secretary, Whiston Hospital, Prescot, immediately. Please state for which post application is made.

ST. HELENS AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. WHISTON HOSPITAL, PRESCOT. (892 Beds.) Applications are invited for the appointment of CASUALTY OFFICER, in the Senior House Officer grade, at above Hospital. The post is approved for the 6 months' training in casualty work required of candidates for the Fellowship Examination of the Royal College of Surgeons.

Applications, stating age, qualifications and experience, and giving 2 names for reference, should be forwarded immediately to N. RICHARDS, Group Secretary, Whiston Hospital, Prescot.

ST. LEONARDS-ON-SEA. BUCHANAN HOSPITAL. (91 Beds. Obstetric, Gynæcological and Premature Baby Unit.) SENIOR HOUSE OFFICER required for Obstetric and Premature Baby Unit. Appointment, recognised for M.R.C.O.G., is vacant 8th January, 1959.

Applications, giving names and addresses of 3 referees, should be addressed to the Hospital Administrator.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. Applications invited for HOUSE OFFICER (medical), vacant early January. Recognised pre-registration post.

Detailed applications to the Secretary at the Hospital.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (815 Beds.) RESIDENT SENIOR HOUSE PHYSICIAN (pædiatrics) required (Senior House Officer grade). Post vacant very shortly. Recognised for D.C.H.

Applications, with copy testimonials, to Hospital Secretary as soon as possible.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (815 Beds.) HOUSE PHYSICIAN (pædiatrics) required. Post vacant very shortly. Pre-registration. Hospital recognised for D.C.H.

Detailed applications, with copy testimonials, to Hospital Secretary.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICERS (general surgery) required. Pre-registration. 2 posts vacant early January. Recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Hospital Secretary, North Staffordshire Royal Infirmary, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) SENIOR HOUSE OFFICER (orthopædics) required. Post vacant very shortly. Some duties also at Hartshill Orthopædic Hospital.

Detailed applications, with copy testimonials, to Hospital Secretary.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (medicine and dermatology) required. Recognised pre-registration.

Applications, with copy testimonials, to the Secretary at the Royal Infirmary, as soon as possible.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (medicine and paediatrics) required. Recognised pre-registration.

Applications, with copy testimonials, to the Secretary at the Royal Infirmary as soon as possible.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. SENIOR HOUSE OFFICER (anæsthetics) required. Post vacant shortly. Recognised for F.F.A. R.C.S. and D.A.

Applications, with copy testimonials, to the Secretary at the Royal Infirmary as soon as possible.

SURBITON GENERAL HOSPITAL, Ewell-road, Surbiton, SURREY. Within easy reach of London (17 minutes). RESIDENT JUNIOR HOUSE OFFICER (surgical) required for post now vacant. Pre-registration post. Duties include casualty outpatients. Post provides interesting experience in surgery and medicine under visiting Consultants. Salary and conditions of service in accordance with national scales.

Applications, stating age, qualifications and nationality with copies of 2 testimonials, to the Administrative Officer, Surbiton General Hospital, Ewell-road, Surbiton, Surrey.

SUTTON AND CHEAM HOSPITAL, Cotswold-road, SUTTON, SURREY. (146 Beds.) General Practitioner required for 1 session a week as CLINICAL ASSISTANT in Physical Medicine Department. Busy department under the charge of a Specialist.

Applications to Group Secretary, St. Helier Hospital, Carshalton, Surrey, by 3rd January.

SUTTON AND CHEAM HOSPITAL, Cotswold-road, SUTTON, SURREY. (146 Beds.) RESIDENT SENIOR HOUSE OFFICER (Casualty Officer). Post recognised for F.R.C.S. Vacant now.

Applications, stating age, qualifications and experience, with copies of recent testimonials and the names of 2 referees, to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

SWINDON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Resident Pre-registration HOUSE SURGEON required for general surgical unit of 80 Beds at Victoria Hospital, Swindon. Recognised for F.R.C.S. Married accommodation available.

Full details, giving names of 3 referees, to Secretary, 7, Okus-road, Swindon.

SWINDON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE PHYSICIAN (pre-registration) required for Acute Medical Unit of 64 Beds at St. Margaret's Hospital.

Full details, with names of 3 referees, to Secretary, 7, Okus-road, Swindon.

SWINDON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the consecutive posts of OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON. The successful candidate will spend 6 months as Obstetric House Surgeon at the Maternity Hospital, Swindon (recognised for the D.Obst.R.C.O.G.) subject to the satisfactory completion of 6 months' service as Gynæcological House Surgeon at St. Margaret's Hospital, Stratton St. Margaret, near Swindon.

Applications to Group Secretary, 7, Okus-road, Swindon, as soon as possible.

TAPLOW, MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. OBSTETRICAL AND GYNÆCOLOGICAL REGISTRAR required, resident or non-resident. Post recognised for M.R.C.O.G.

Application forms from and returnable to Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, by 3rd January.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. Locum REGISTRAR in Obstetrics and Gynæcology required from 18th December for approximately 3 months.

Applications, with names of 2 referees, to Secretary.

TORQUAY. TORBAY HOSPITAL. (180 acute general beds.) HOUSE OFFICER (medicine), Male or Female, required from last week of November. Pre-registration appointment. General duties which will include some work in the E.N.T., the Ophthalmic, and Radiotherapy Departments.

Applications, stating qualifications, nationality, age, together with copy testimonials (quoting reference F.955/91), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TAUNTON AND SOMERSET HOSPITAL, Taunton, SOMERSET. HOUSE PHYSICIAN required mid-January. Pre-registration post recognised for F.R.C.S.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, to the Group Secretary, Taunton Hospital Management Committee, c/o Musgrove Park Hospital, Taunton, immediately.

TAUNTON AND SOMERSET HOSPITAL, Taunton, SOMERSET. HOUSE OFFICER (general surgery) required. Pre-registration post. Recognised for F.R.C.S. Post vacant 14th January, 1959.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, c/o Musgrove Park Hospital, Taunton.

TAUNTON AND SOMERSET HOSPITAL, Taunton, SOMERSET. HOUSE OFFICER (E.N.T.) required. Post vacant early January. Post-registration appointment, recognised for F.R.C.S. and D.L.O.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, c/o Musgrove Park Hospital, Taunton.

TAUNTON AND SOMERSET HOSPITAL, Taunton, SOMERSET. JUNIOR HOSPITAL MEDICAL OFFICER, Male or Female, required for full-time, resident casualty and orthopædic work.

Applications, stating age, nationality, qualifications and experience, to the Group Secretary, Taunton Hospital Management Committee, c/o Musgrove Park Hospital, Taunton.

TILBURY AND RIVERSIDE GENERAL HOSPITAL. ORSETT BRANCH, ORSETT, ESSEX. Applications are invited for the post of RESIDENT ORTHOPÆDIC HOUSE SURGEON at the above Hospital. The post is recognised under the Medical Act for pre-registration purposes, and suitable candidates are invited to apply. There exists a new Casualty Reception Unit at this Hospital. The appointment, which becomes vacant immediately, is for 6 months in the first instance.

Applications, together with copies of recent testimonials, should be forwarded to the undersigned.

G. E. WHYTE, Group Secretary,
Tilbury and South East Essex Hospital Management Committee.

Thurrock Hospital, Grays, Essex.

TUNBRIDGE WELLS. KENT AND SUSSEX HOSPITAL. TUNBRIDGE WELLS GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (E.N.T.) or Locum, required. Male or Female. Vacant 5th January. Recognised for F.R.C.S. and D.L.O.

Applications, giving age, qualifications, experience, and names of 2 referees, to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. Regional Thoracic Centre. Applications invited for position of SENIOR HOUSE PHYSICIAN. Salary £819 10s. p.a. £150 p.a. charged for accommodation.

Address written applications, giving full personal particulars, details of experience, and 2 names and addresses for reference, to W. BOWRING, Group Secretary, Pinderfields General Hospital, Wakefield.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. Applications invited for position of SENIOR HOUSE OFFICER in the Neurological Department. Salary £819 10s. p.a. A charge of £150 p.a. is made for accommodation.

Address written applications, giving full personal particulars and details of experience, &c., together with 2 names and addresses for reference, to W. BOWRING, Group Secretary, Pinderfields General Hospital, Wakefield.

WALSALL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointments :—

Manor Hospital (340 Beds)
HOUSE PHYSICIANS (2).

General (Sister Dora) Hospital (181 Beds)
HOUSE PHYSICIANS (2).

The above Hospitals are acute general hospitals situated in a densely populated industrial area and give wide experience in all branches of medicine and surgery. Posts recognised for pre-registration. Duties mainly acute medical, with opportunities for additional experience in cardiology, chest diseases, diabetes, and dermatology.

Applications, together with names of 2 referees, to Group Secretary, Walsall General (Sister Dora) Hospital.

WALSALL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointments :—

Manor Hospital (340 Beds)
HOUSE SURGEONS (2).

General (Sister Dora) Hospital (181 Beds)
HOUSE SURGEONS (2).

The above Hospitals are acute general hospitals situated in a densely populated industrial area and give wide experience in all branches of medicine and surgery. Posts recognised for pre-registration. Hospitals recognised by R.C.S. Opportunities for experience in general surgery, orthopædics, gynæcology, and E.N.T. surgery.

Applications, together with names of 2 referees, to Group Secretary, Walsall General (Sister Dora) Hospital.

WARNEFORD GENERAL HOSPITAL, Leamington Spa. (211 Beds.) CASUALTY OFFICER (Senior House Officer) Male or Female, preferably resident, and suitable for one reading for higher qualifications, being recognised for F.R.C.S., affording contact with all Specialist Units in the Hospital. Post vacant 28th January, 1959.

Applications, with names and addresses of 3 referees, to Hospital Secretary.

WARRINGTON INFIRMARY. (172 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (Male or Female) (graded as Senior House Officer). The post will be vacant early in January. The Hospital is recognised for the D.A. examination. Salary is £819 10s. p.a., less a deduction of £150 p.a. for residential emoluments.

Applications, stating qualifications and experience, should be sent to HENRY L. BOOT, Group Secretary, Warrington and District Hospital Management Committee, c/o General Hospital, Warrington, Lancs.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (211 Beds.) Applications are invited for the post of HOUSE PHYSICIAN at the above Hospital. Pre-registration post vacant 14th January, 1959. Salary in accordance with the National Health Service scale.

Please send applications, with copies of 2 recent testimonials, to the Administrator.

WIGAN. ROYAL ALBERT EDWARD INFIRMARY. (198 acute general beds.) HOUSE SURGEON, pre-registration post.

Applications, with names of 2 referees, to Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan.

WIGAN. ROYAL ALBERT EDWARD INFIRMARY. (200 Beds.) SENIOR HOUSE OFFICER in Orthopædic Surgery.

Applications to Secretary, Royal Albert Edward Infirmary, Wigan.

WIGAN. ROYAL ALBERT EDWARD INFIRMARY. SENIOR HOUSE OFFICER for duty in the Paediatric Department at Wigan Infirmary with neonatal work at Billinge Hospital. Post recognised for D.C.H. Previous paediatric experience necessary.

Applications, with names of 2 referees, to the Secretary, Royal Albert Edward Infirmary, Wigan.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COMMITTEE. LEIGH INFIRMARY, LEIGH. SENIOR HOUSE OFFICER required for Casualty Department, with gynaecological and surgical duties at Astley Hospital.

Apply Secretary, Knowsley House, Wigan.

WIGAN AND LEIGH HOSPITAL MANAGEMENT COMMITTEE. BILLINGE HOSPITAL, near WIGAN. REGISTRAR IN PSYCHIATRY. The post offers good experience under Consultant Psychiatrist. Main centre at Billinge Hospital, where there is an active psychiatric unit with modern treatment and over 300 admissions annually. Post recognised for D.P.M.

Applications, with names of 2 referees, to Secretary, Knowsley House, Wigan.

WELSH REGIONAL HOSPITAL BOARD. 2 Registrars in Plastic Surgery, St. Lawrence Hospital, Chepstow (182 Beds). Expected to visit other hospitals in South Wales area. Considerable opportunities for training in specialty. Accommodation for single person. Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WESTON-SUPER-MARE GENERAL HOSPITAL. (104 Beds.) Applications are invited from duly qualified medical practitioners for the pre-registration appointment of HOUSE PHYSICIAN. Single residential accommodation provided. Vacant January, 1959.

Applications, stating age, qualifications, together with names and addresses of 2 referees, should be addressed to the Group Secretary, Weston-super-Mare Hospital Management Committee.

WHITEHAVEN HOSPITAL, Cumberland. (122 Beds, pre-registration post., recognised F.R.C.S.(Ed.).) HOUSE SURGEON (first, second or Senior House Officer post). Vacant January.

Detailed applications with dates, and names of 2 referees, to Group Secretary, Workington Infirmary, Cumberland.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (324 Beds.) SENIOR HOUSE OFFICER, Pathological Department. Vacant 1st January, 1959. Preferably resident. Duties will include training in the various branches of clinical pathology, especially haematology. Previous experience in clinical pathology desirable, but not essential.

Applications, with copies of 2 testimonials, to the Hospital Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. House SURGEON in General Surgery required, Male or Female, for post vacant 2nd January. Recognised for F.R.C.S. Pre-registration post.

Applications, with copies of recent testimonials, stating age, nationality, qualifications, with dates, to Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. House PHYSICIAN required, Male or Female, for post vacant 10th January. Pre-registration post.

Applications, stating age, qualifications, with dates, and nationality, with copies of 3 recent testimonials, to Secretary.

WINDSOR. KING EDWARD VII HOSPITAL. Resident SURGICAL REGISTRAR required mid-February.

Application forms obtainable from and returnable to Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, by 31st December.

WOKING, SURREY. VICTORIA HOSPITAL. (72 Beds.) SENIOR HOUSE OFFICER (post-registration appointment) required for medical, surgical and casualty duties.

Apply, with 2 testimonials, to Hospital Secretary.

WOLVERHAMPTON. ROYAL HOSPITAL. Pre-registration HOUSE OFFICER (general surgery). Post recognised for F.R.C.S. 2 vacancies in January.

Apply, with copies of 2 testimonials, to the Secretary.

WORCESTER ROYAL INFIRMARY. House Surgeon (pre-registration or otherwise) required for General Surgery post at this busy general hospital of 213 Beds. The appointment offers wide and varied experience and is recognised for the F.R.C.S. examinations.

Applications to Hospital Secretary.

WORTHING HOSPITAL, Lyndhurst-road, Worthing, SUSSEX. Applications are invited from registered medical practitioners, or pre-registration candidates, for the posts of HOUSE PHYSICIAN and HOUSE SURGEON at Worthing Hospital, vacant mid-January.

Applications, stating age, qualifications, experience, nationality, together with copies of 2 recent testimonials, to Hospital Secretary.

A. V. OAKTON, Group Secretary,
Worthing Group Hospital Management Committee.

WREXHAM. MAELOR GENERAL HOSPITAL. (591 Beds.) Applications are invited for the post of PAEDIATRIC HOUSE PHYSICIAN at the above Hospital, to commence 1st February, 1959. The appointment is recognised for the D.C.H., and for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of 2 recent testimonials, should be addressed to the Group Secretary, Wrexham, Powys and Mawddach Hospital Management Committee, Maelor General Hospital, Wrexham, Denbighshire.

WREXHAM. MAELOR GENERAL HOSPITAL (591 Beds). WAR MEMORIAL HOSPITAL, WREXHAM (230 Beds). Applications are invited for HOUSE PHYSICIAN posts at the above Hospitals, to commence 1st February, 1959. The appointments are recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of 2 recent testimonials, should be addressed to the Group Secretary, Wrexham, Powys and Mawddach Hospital Management Committee, Maelor General Hospital, Wrexham, Denbighshire.

WREXHAM. MAELOR GENERAL HOSPITAL (591 Beds). WAR MEMORIAL HOSPITAL, WREXHAM (230 Beds). Applications are invited for HOUSE SURGEON posts at the above Hospitals, to commence duties on 1st February, 1959. The appointments are recognised for the Diploma of F.R.C.S. (England, Edinburgh, and Ireland) and are pre-registration posts.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Wrexham, Powys and Mawddach Hospital Management Committee, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM (near). TREVALYN MANOR MATERNITY HOSPITAL, ROSSETT, near WREXHAM. (47 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital, to commence duties on 1st February, 1959. The Hospital is a Part II midwifery training school and deals with normal and abnormal midwifery. This Hospital will be transferred in March, 1959, to a new Maternity Unit at the Maelor General Hospital, Wrexham.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

WREXHAM. WAR MEMORIAL HOSPITAL. (230 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER in the Orthopaedic Department of the above Hospital, commencing 1st February, 1959. The post is a residential one and affords particular facilities for postgraduate study. Successful applicant will be allowed to attend for 2 days a month at the Robert Jones and Agnes Hunt Orthopaedic Hospital, Oswestry. The Hospital is recognised for the Diploma of F.R.C.S. (England, Edinburgh, and Ireland).

Applications, stating age, nationality, qualifications and experience, together with copies of 2 recent testimonials, to be addressed to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

CANADA. THE PRINCESS MARGARET HOSPITAL, 500, Sherbourne-street, TORONTO, 5, CANADA. Applications are invited for the position of RESIDENT INTERNE Staff in Radiotherapy for the period of 1st July, 1959, to 30th June, 1960. The salary at the rate of $200 per month plus maintenance. This post offers an ideal opportunity for training in Radiotherapy or as an introduction to cancer treatment and investigation. Applicants must possess qualifications of a British Commonwealth University and be registered with the General Medical Council.

Applications to the Chairman of the Interne Committee should be supported by copies of testimonials and a record of work since graduation. W. D. RIDER, M.B., Chairman, Interne Committee.

U.S.A. VETERANS ADMINISTRATION HOSPITAL. RESIDENT HOUSE PHYSICIAN in Radiology. Training approved by American Examining Board in specialty. Salary $3000 first year to $5000 fourth year. This 500-Bed hospital is a general teaching hospital integrated with the State University of Iowa College of Medicine and the University Hospital of 1500 Beds. Credit may be given for previous approved training. There are 6 British physicians presently on University Hospital permanent staff in senior positions. Applicants must pass the examination of Educational Council for Foreign Medical Graduates (located at 1710, Orrington-avenue, Evanston, Illinois, U.S.A.). The examination is given in February and September. Write above address for examination in Britain.

Applications received by the Manager, U.S. Veterans Administration Hospital, Iowa City, Iowa, U.S.A.

Public Appointments

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
MAIDENHEAD ..	BERKSHIRE ..	10TH JANUARY, 1959

COVENTRY CORPORATION require School Medical OFFICER AND ASSISTANT MEDICAL OFFICER OF HEALTH (joint post) for duties connected with medical inspection and clinic treatment of schoolchildren, maternity and child welfare work, and such other duties as the Medical Officer of Health and Principal School Medical Officer may include from time to time. Qualifications/experience in ascertainment of handicapped pupils an advantage. Salary £1050–£1475. Commencing salary according to experience/qualifications. Removal loan available.

Application forms, &c., from Medical Officer of Health, New Council Offices, Coventry, returnable without delay.

NOTTINGHAMSHIRE COUNTY COUNCIL. Hucknall URBAN DISTRICT COUNCIL. Mixed appointment. Applications are invited from registered medical practitioners for the mixed whole-time appointment of ASSISTANT COUNTY MEDICAL OFFICER AND MEDICAL OFFICER OF HEALTH to the Hucknall Urban District. Applicants must have had at least 3 years' professional experience since qualifying, be experienced in the duties of Medical Officer of Health, School Medical Officer, and in the care of mothers and young children, and possess a Diploma in Public Health.

Salaries are in accordance with the recommendations of the Medical Whitley Council for Public Health Medical Officers holding mixed appointments, namely:—

(*a*) As Assistant County Medical Officer (32/44ths), £954 10s. 11d.–£43 15s.–£1173 5s. 11d. (On scale £1200–£55–£1475 plus loading in accordance with Spens formula.)

(*b*) As Medical Officer of Health (12/44ths) £501 16s. 4d.–£15–£561 16s. 4d. (On scale £1740–£55–£1960 plus 12/44ths of £100.)

Application forms and conditions of appointment are obtainable from my office, and applications should reach me by 10th January, 1959. Canvassing disqualifies.

A. R. DAVIS, Clerk of the County Council.

Shire Hall, Nottingham.

WARWICKSHIRE COUNTY COUNCIL

ASSISTANT COUNTY MEDICAL OFFICERS OF HEALTH AND SCHOOL MEDICAL OFFICERS, combined with a bursary scheme for taking the Diploma in Public Health.

Applications invited from young medical practitioners desiring career in public health. At least 2 years' medical experience and an agreement to serve County Council for 4 years are required. In fourth year, paid leave granted for full academic year to attend London University to take D.P.H.; living, travelling and course expenses paid.

Salary (assuming 2 years' experience in medicine):—

First 3 years £1000 p.a. (increments contributing towards cost of D.P.H. course).

Fourth year £1000, plus expenses not exceeding £316.

Posts kept open for candidates who may, if satisfactory, return after course to service of County Council at a salary of £1310, rising to £1475 p.a.

An officer withdrawing from bursary scheme would receive full adjustment of salary.

Posts superannuable from date of appointment. Successful candidates will be required to produce satisfactory medical certificates. Car is essential, for which Whitley Council scale of allowances is payable. Car purchase loan scheme available. Consideration will be given to financial assistance towards removal expenses.

Forms of application, with further complete details of the bursary scheme and the appointments of Assistant County Medical Officer of Health, can be obtained from the County Medical Officer of Health, Shire Hall, Warwick. Closing date for applications is 17th January.

L. EDGAR STEPHENS, Clerk of the Council.

Shire Hall, Warwick. 10th December, 1958.

BARBADOS. Assistant Radiologist required to assist Specialist Radiologist at General Hospital in both Diagnostic and Therapy Sections and to supervise work of X-ray Department of Health Centre where routine chest X-ray examinations for tuberculosis clinics, emigrants, and Government employees are performed. Candidates must possess qualifications registrable in United Kingdom, with higher qualification in radiology. Experience in reading X-ray films desirable. Appointment on permanent basis with pension (non-contributory) 1/600th of final pensionable emoluments for each completed month of pensionable service; or agreement for 3 years (in which case employer's share of approved superannuation contributions will be paid). Salary scale £1300–£1500 p.a. Income-tax at local rates. Government quarters not available. Rental for unfurnished houses ranges from £200 to £250 a year, and for furnished houses £300 to £375. Free passages for officer, wife, and family up to maximum cost of £400 each way. Permanent officer granted leave passages for himself and wife only. Climate healthy. Educational facilities for children available.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117/28/025).

GOVERNMENT OF QATAR, PERSIAN GULF. Applications are invited for the post of RADIOLOGIST in the Qatar State Medical Department. Salary is on scale 2700 rupees per month (equivalent to £2430 p.a.), rising by annual increments of Rs. 100 to a maximum of Rs. 3300 per month. Point of entry according to qualification. Contract is for 2 years or longer with probationary period of 6 months. Gratuity payable on termination of contract. Leave is six days for each month on duty and is taken annually. Free fully furnished accommodation, fuel, light, water, medical treatment, car, and return passages provided. No income-tax. Applicants should have a D.M.R.D. London or equivalent qualifications with experience of radiotherapy. Knowledge of Arabic an advantage. Radiologist is responsible for first-class radiological unit in modern hospital.

Applications, in duplicate, should be addressed to C. TENNANT SONS AND CO., LTD., 4, Copthall-avenue, London, E.C.2, giving full personal particulars, including photograph, and details of qualifications, experience, and employment, to arrive not later than 31st December, 1958.

GOVERNMENT OF THE FEDERATION OF NIGERIA. ANÆSTHETIST required to administer anæsthetics in Government hospitals in Lagos, instruct junior medical officers and perform such other duties as may be assigned to him. Candidates must possess medical qualifications registrable in the United Kingdom, the Diploma in Anæsthetics (if obtained prior to November, 1953) or Fellowship of the Faculty of Anæsthetists. Appointment either as Special Grade Medical Officer or as Specialist.

Appointment may be:

(*a*) on short-term contract for 1 tour of 18–24 months with salary of £2664 a year, or on scale from £1536 to £2286 for Special Grade Medical Officer. On completion of contract a gratuity (taxable) is paid at rate of £37 10*s.* for each completed period of 3 months' service, including leave.

(*b*) from National Health Service, candidate retaining superannuation rights and receiving gratuity (taxable) of 20% of aggregate of salary. Salary £2220 a year, or from £1326 to £1950 for Special Grade Medical Officer.

Quarters at low rental. Free return passages for officer and wife. Return passages for children, to age 18, provided this does not exceed cost of 2 adult return passages in any 1 tour of service, or the grant of this assistance may be used to allow wife to visit children in officer's home country. Children's (separate domicile) allowance of £75 a year for each of up to 2 children under 18, ceasing if children join parents in Nigeria. Income-tax at low local rates. Local leave permissible and generous home leave after each tour.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117/14/045).

FEDERATION OF RHODESIA AND NYASALAND. Applications are invited for newly qualified Doctors for posts as JUNIOR RESIDENT MEDICAL OFFICERS in the Federal Ministry of Health.

Vacancies at Bulawayo, Gatooma, Gwelo, Que Que, Fort Victoria, Lusaka, Broken Hill, Ndola.

Salary £69 3*s.* 4*d.* per mensem, less a deduction of £15 per mensem for board, quarters and laundry, when these services are provided. In Northern Rhodesia, quarters and laundry only are provided, for which a deduction of £6 per mensem is made.

A single air fare to the Federation will be provided, subject to certain conditions.

Application forms and further details from the Secretary (R2), Rhodesia House, 429, Strand, London, W.C.2. Closing date 10th January.

Hospital Services: Non-Medical Appointments

BISHOP'S STORTFORD, HERTFORDSHIRE. HERTS AND ESSEX GENERAL HOSPITAL. (341 Beds.) SENIOR TECHNICIAN, Grade I. Mainly required for Biochemistry in Area Laboratory at the above Hospital. Present salary £620 p.a. rising to £760 p.a. in accordance with Whitley Council scales. Appointment to commence during February, 1959.

Applications to Hospital Secretary, together with names of 2 referees.

Miscellaneous

THE UNIVERSITY OF MANCHESTER. Applications are invited from persons with training in medical art for the post of Medical Artist. The artist is responsible for the preparation of paintings, drawings, diagrams, and similar works for members of the staff of the Medical School, both in the University and in the United Manchester Hospitals. Salary not less than £750 p.a. Duties to begin in April, 1959, or as early as possible thereafter.

Applications should be addressed to the Registrar, the University, Manchester, 13, and should reach him not later than 31st January, 1959. Applicants should give the names of not more than 3 persons to whom reference may be made, and may also submit copies of not more than 3 testimonials, which will *not* be returned.

CIBA

As a result of expansion, CIBA'S British Pharmaceutical Company at Horsham, Sussex, requires a well-qualified man, preferably with a medical degree, to advise on the promotion of the Company's products to the medical profession, to write the relevant copy for booklets and leaflets describing them, and to write and edit scientific publications. Salary will be competitive and progressive and there is a good pension scheme.

Details of education and experience to the Secretary, CIBA LABORATORIES LIMITED, Horsham, Sussex.

British Petroleum Company Limited has a vacancy for a Male Locum Medical Officer for approximately 6 months commencing April, 1959. 4 months' service will be at the Company's fully-equipped Hospital in Aden as leave relief for the Anæsthetist, plus general medical duties, thus anæsthetic experience is essential, the D.A. would be an advantage. A further 2 months will be on general medical duties in a development area in the Persian Gulf where there is a small first-aid, but adequately equipped, medical centre. No married accommodation is available in either centre. Candidates, registered in the British Medical Register and aged 26–35 years, should apply, giving full details and quoting F.565, to Box 3138, c/o 191, Gresham House, E.C.2.

Applications are invited for the post of Business Manager at the Queen Elizabeth Hospital (182 Beds), Umuahia, Eastern Nigeria. Experience in accountancy is essential. Desirable to have knowledge of hospital administration and diesel generators. Hospital run jointly by Anglican, Methodist, and Presbyterian Missions and the Government of Eastern Nigeria. Applicant should be in sympathy with the missionary aim of the Hospital. Salary £900 p.a. Applications, with 3 recent testimonials, by air, to the Chairman of the Board of Governors not later than 31st December, 1958.

S.R.N., 22, with shorthand and typewriting, requires position with Physician or Surgeon as Secretary-Receptionist, commencing January.—LAUGHTON, 105, Chislehurst-road, Orpington, Kent.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimens of urine and £2 2*s.* fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Doctors requiring applications, theses copied: Write to MANTON (WESTMINSTER) LTD., 153, Victoria-street, S.W.1 (VIC. 0141), who are specialists.

Microscopes. Highest prices paid for good modern types. Send or bring your equipment for valuation.—WALLACE HEATON LTD., 127, New Bond-street, W.1.

Hypnotism. Will all doctors interested in this subject for Medical purposes please write to the Secretary, British Society of Medical Hypnotists, 126, Harley-street, W.1.

Wanted. Nos. 1, 2, 4, 5, "Clinical Orthopædics" (Lippincott).—Address, No. 450, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Cambridge Portable Electrocardiograph with accessories. Modern instrument in good condition. Offers.—Mr. J. R. ADAMS, Royal Free Hospital School of Medicine, 8, Hunter-street, London, W.C.1.

PUBLISHED by the PROPRIETORS, THE LANCET LIMITED, 7, Adam Street, Adelphi, in the County of London.
Printed by HAZELL, WATSON AND VINEY, LTD., Leigh Road, Slough and Aylesbury—Saturday, December 20, 1958.
PRINTED IN GREAT BRITAIN—Entered as Second Class at the New York, U.S.A., Office.

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